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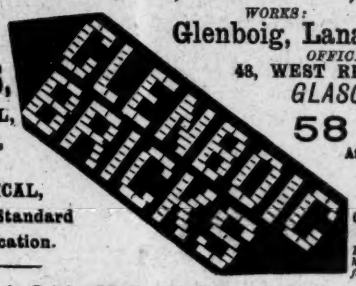

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EDITORIAL NOTES.

Standard Specification for Gas-Cookers.

THE report on gas-cookers of the Standardization Committee of the National Gas Council has been issued, together with the adopted specification. In another part of this issue, we commence the publication of these documents. But it ought to be said that the Council have printed the report and the specification, in book form, with the drawings; and it is a production that should be possessed, and kept. In the material of which it is composed, it is something unique; for the gas-cooker has never undergone such an overhauling as it has received at the hands of the Committee, and particularly of the Sub-Committee, the Chairman of the former of whom was Mr. F. W. Goodenough, and of the latter Mr. R. J. Rogers. It must be acknowledged at once that the Committee have entered into their work enthusiastically, have done it thoroughly, and have covered well not only the question of standardization, but efficiency, and in this connection the raising of the efficiency of existing gas-cookers by providing for conversion and adaptation. In doing all they have done, they have really exceeded, with considerable advantage, the plain terms of their reference. This simply provided that the Sub-Committee should draw up a standard specification or specifications for, and should make recommendations as to, gas-cookers, having full regard to efficiency and utility, especially with relation to the burners, simplicity of design, and low cost of manufacture, and to embrace in the recommendations cookers suitable for consumers using prepayment meters. The reference superficially appears to be a fairly modest matter; but actually it is not so. Indeed, the work of the Committee has involved a very considerable amount of testing and research. But here is the result in the report and specification.

The report gives us the wherefore of all that is compassed by the specification. It will be no derogation of the work of the Committee, seeing that they themselves point it out, to emphasize the fact that "the report consists mainly "of proposals for the standardization of the gas-cooker sub-"stantially in its present form, and that no novel feature "has been incorporated." What novel ideas have been submitted to the Committee have apparently not been accepted by them. They have been on the alert for them; but it has ended at that. This being so, it is obvious that the gas-stove manufacturers have been on the right lines in respect of the improvements they have been making. The Committee's investigations, however, have evidently taken a selective course—selection being guided by experiment—and from the mass they have extracted and assembled those structural elements and methods that have proved themselves the fittest for purpose and standardization, having in view both efficiency and constructional cost, which is highly important in these times when we want to have appliances at as low a price as possible, in order to create new gas business. Standardization and the proposed interchangeability of parts for maintenance should result in reduced costs; and the improvements in design and aids to economy and efficiency should be of service to, and promote savings for, the users.

A question that will be asked is, Will the proposed standard cooker rise superior in these respects to anything that already emanates from the works of the manufacturers? It is gas managers who will ask this question. Some of the manufacturers will probably reply that they have doubts, while not asserting that the proposed standard cooker does not possess merit. But the admission that it has better points will be very hard to extract from some of the makers. On the other hand, when one sees the large difference there is between the individual consumptions and the duties of various types of cookers, both in the ovens and on the hotplates, it is clear that the best examples of the makers' productions have not been the standard all through. That is one point in standardization. The Committee and the National Gas Council want to ensure that, when a standard cooker is purchased, it will, in similar circumstances of use, and properly handled, give the user, with a like expenditure of heat units, the same results. If these can be obtained, then it cannot be denied that something highly beneficial to the gas industry will have been achieved; for it is the inefficient that does mischief, and, curiously enough, it is upon the inefficient that the industry is largely judged, and the most inefficient is usually regarded as the proper standard to take by the competitors of gas. While, however, working for standardization, the Committee make it perfectly clear that they do not desire to hinder development by excluding new ideas. They also think it possible that certain minor structural details of the specification may call for slight modification; but they consider that any alteration of the principles embodied in the specification is undesirable at the present time. They further very strongly insist on the necessity, to secure and maintain correct standardization of parts, of having a set of standard master patterns; and, in addition, it is also most important that standard jigs should be produced to guarantee the proper interchangeability of parts as made by the various manufacturers. This interchangeability will mean a big saving to gas undertakings, but the manufacturers may not altogether approve of it, although agreeing as to the desirability in respect of their own individual productions.

The Committee recommend five sizes of cooker. Four would suffice; but the additional one is of a size suitable for boarding-houses, &c. They also suggest three sizes of boiling-ring—consuming (1) up to 15 c.ft. per hour, (2) up to 24 c.ft.; and (3) up to 36 c.ft. We wonder why the Committee did not quote the consumptions on the thermal basis, seeing that the gas supply in the country to-day varies between (say) 400 and 560 B.Th.U. per cubic foot. This by the way. As we shall be publishing as a serial the report and specification *in extenso*, we do not think it is essential to enter in detail into the elements comprised in the specification. The advantages are set forth of the reduction and interchangeability of parts, gas and air adjustment, accessibility of parts, useful oven capacities, drilled ring-burners, and other features. Just a point as to the drilled ring-burners. The Committee give reasons which they consider conclusive regarding this preference; but at the same time they point out that, should any gas undertaking require to use flame-spreading types of ring-burners, this may be effected in the standard hot-plate by special arrangement between gas undertakings and the gas-stove manufacturers. The objection advanced to the use of spreading flame burners is that, owing to the proximity of the flame-cones to the vessel, it is possible for the cones to become broken—resulting in incomplete combustion and consequent smells. This cannot happen with a properly drilled ring burner set at a distance of 1¼ in. between the top of the burner and the top of the gas-grid, as it receives full aeration with any size of vessel used.

The question of the thermal efficiency of the hot-plate and the oven has been very carefully studied by the Committee; and satisfactory results, it is said, can be assured without any drastic departure from the present well-known methods of construction. The greatest improvement that

has been made is, of course, in the hot-plate; and hot-plates constructed on the new principles have been in use during the past two years. Here we come to the confirmation of the variable efficiencies of hot-plate burners. Tests of 29 different types of burners, with cast and wrought iron bars above, gave an average consumption of 2·79 c.ft. per quart of water boiled; but the average consumption of the newer type of burners, when tested at varying rates from 12 to 24 c.ft. per hour, was 2·1 c.ft. with open cast grids. It would be interesting to know the calorific power of the gas. Thus, by adopting open cast grids with improved design of burners, a direct saving of 0·69 c.ft., or 24·7 p.ct., per quart of water boiled may be obtained. This is due chiefly to more intimate flame contact with the vessel. In equal circumstances as to burners, it was found that with open cast grids 2·1 c.ft. was burned per quart of water, but with wrought-iron bars 2·46 c.ft.—a saving of 0·36 c.ft.

The necessity for the regulation of the primary air to cooker burners is regarded by the Committee as a very important feature. It is. There is not a great number of gas-works that can supply year in, year out, gas of unvarying composition and thermal value; and their economic potentiality would be seriously limited if they had not the power to regulate the gas and air supplies to the gas-consuming appliances on the district. Gas-cookers and other appliances do go on year in, year out; and so the ability to regulate is highly important to the majority of gas undertakings. It will be remarked that the Committee define the conditions that a satisfactory regulator should fulfil; and they discuss the various designs and modes of operation. They appear to incline to the method by which the air-inducing power of the injector can be varied. This has been found quite satisfactory; and it allows of the aeration being changed over a wide range of gas qualities to meet all gas-cooker requirements.

If there are new cookers that can be found to be in respect of efficiency somewhat remote from the best standard, then what of the multitude already fixed in houses? Many of them would be all the better for some modernization—particularly of the hot-plate. The Committee deal with the question of remodelling and conversion, in order to realize economy and efficiency. Maintenance is one of the advantages of interchangeability; conversion to a higher state of efficiency another. Old burners and bars can, if required, be gradually replaced as the cookers are brought in from the district. The Sub-Committee are of opinion that the question obviously is one that can be best dealt with by each undertaking after a standard cooker is actually produced; and it may even be found possible to remodel many of the existing cookers by using parts of the standard cooker.

This comment shows that the report, if it does not originate novelty, is a highly important document; seeing that a universal advance in the economy and efficiency of gas cooking apparatus throughout the industry is something that would be of immense service to progress and stability. Here we have only touched upon the part of the report which forms the instalment appearing on other pages. Oven construction and the specification proper will be treated in succeeding issues.

Tentative Electrical Trading Schemes.

IMITATION is said to be the sincerest form of flattery; but those who in this way flatter do not do so with the intention, but because to imitate, or to pursue the same course, either pleases them or serves some purpose. It does not, however, follow that those who copy can do so with results equal to those secured by the copied. The gas industry may secure excellent results from one course in business; the electricity industry may copy the gas industry in that particular, but, unless on equal terms, the results may not and cannot be the same. For example, assuming that, in the case of the gas industry, thermal energy is supplied at a price five to six times cheaper than electrical heat energy (though the efficiencies in use of the two agents may not run parallel), and supposing cost of installation and of appliances is in favour of gas, then electricity would suffer a serious handicap, though attempting to imitate gas in its methods of developing demand.

The Hackney Borough Council are proposing to try to develop the use of electricity among the working and middle classes in their area. In many places responsible electrical men are considering this matter, because, unless they reach the lower strata of householders in their trading, they see very definite limits set to their business potentiality. Electricity undertakings have often made efforts to obtain the custom of the working and middle classes; but so far without any great measure of success. They have been mostly flashes in the pan—nothing perennial. But several authorities are now seriously setting their minds to the problem. The Councils of three London boroughs are doing so, and among them Hackney. The Council recently instructed the Borough Electrical Engineer (Mr. L. L. Robinson) to report on the subject, as they had visions of electricity being used for every possible domestic purpose by people of limited means, and without much expense for installation. Of course, the vision remains a vision. Miracles cannot be worked to-day, even to enable the electricity industry to obtain additional custom. One cannot concentrate more B.Th.U. in a unit of electricity, and one cannot reduce the cost of electrical installation and appliances below a legitimate economic level in order to allow people to use that source of energy for all purposes. If the cost were reduced below a legitimate level, someone would have to suffer in the process.

However, the Electrical Engineer of Hackney is not a man to try to do something by ignoring the hard facts of the situation. He knows very well that the problem of the cost of installation and of the appliances is one of first-rate importance; and though he has made certain recommendations, it is quite obvious that he realizes the difficulties of initial cost. Mr. Robinson has therefore tried to meet the wishes of his Council; and he has done a very proper thing in scanning the methods of the gas industry, to ascertain whether experience has anything that is acceptable, and can be applied to electricity supply, though probably not with equal advantage. The "Electrical Review" tells us that "Mr. Robinson acknowledges his indebtedness to the Gas "Light and Coke Company for the suggestion, as this "Company, realizing how much revenue might be obtained "by a graduated system of paying installation costs, has "already in operation a method involving this principle. "There is nothing undignified in adopting the scheme of a "competitor; and gas has gleaned more than one useful "inspiration from electricity." So it is by a graduated system of payment for installation that the prospective electricity consumers of limited means are to be obtained; and the total running cost is to be a matter for their experience, and in cases rude awakening to the real facts. It appears that two wiring systems and duplicate meters will be required to give effect to the scheme. Installation will therefore be expensive, because the recommendation is that the supplies should be given through shilling-in-the-slot prepayment meters. The charge is to be 2d. in excess of the ordinary flat-rate for lighting, and ½d. in excess of the ordinary cooking and heating rate. Based on present prices, this would amount to 8d. and 1½d. per unit respectively. This is merely the prepayment system, with the difference that the value of the installation would be stated when made; and the consumer would have the option at any time, or by instalments, to pay the sum, and on completion of payment would be entitled to have the charge per unit reduced to the ordinary rate for consumers who have provided their own services and installations. The complete cost of the lighting installation is put at £14, and of the cooking installation at £20—together £34. To working class and many middle-class people £34 is a big sum. The Council have been recommended to earmark for the purpose of these installations £5000 out of revenue; and this, it is said, will provide for the fitting-up of about 150 houses. The £5000 allows £33 6s. 8d. per house; so that, if estimates work out exactly, there will be about £100 short.

This is the proposal. Whether it will pay depends on the running cost and reliability experiences of the users. We fancy working-class and middle-class householders will be rather chary about indulging to any extent in this (to them) speculative business. Mr. Robinson himself reckons the lighting bill, with a six-light installation, would be at 8d. a unit £5 per annum; and for cooking (nothing is said about heating in the estimate of running cost) £6 5s.—together £11 5s., or 4s. 4d. per week all the year round. On top of this, coal for heating will have to be purchased. The figures include no margin for extravagant use. We are not persuaded that the scheme will prove profitable. Time will show. The "Electrical Review," however, considers the experiment is on an adequate scale; and it hopes that the results will enable the Council to proceed still further, until Hackney becomes an "all-electric" borough. The non-

fulfilment of this hope is in the hands of the Gas Light and Coke Company. The more economical service among the working and middle-class householders is the one that will maintain the largest measure of success. The gas industry is not overlooking these tentative schemes of the electricity industry; and those of its men who are alive to the importance of acting at the inceptive stage of new competition will proceed accordingly.

A New Carriage for Spiral Holders.

IT is often said that there is nothing absolutely new under the sun. In a general sense this may be correct. Yet there is a decided element of novelty in the gasholder carriage, patented by Mr. R. W. Broadhead, which we have had the opportunity of investigating through Messrs. Robert Dempster & Sons, Ltd., of Elland. We are familiar with nearly all the various types of carriages for spiral holders made by well-known gasholder contractors, but were quite unprepared for such a radical departure from what may be termed standard practice.

The patentee has evolved a new use for ball bearings; but let us point out at once that the common action of a ball bearing is not relied upon in this carriage. The principle on which ball bearings are constructed is the provision of continuous races or paths between which the balls can roll in contact with both; and as the circular form gives a continuous path, and is adaptable to most cases where this form of bearing is required, this is the generally adopted shape; and it matters not whether one or both races revolve or not, or even turn in opposite directions. This would appear to preclude the application of such a bearing to a spiral-guide rail; for such has a travel limited to its length. Yet by an ingenious form of roller path, this is now accomplished.

The spiral guide, or rail, is designed to form one of the races or paths for contact with the balls, and is made of a special section, which we are informed is stronger and much heavier than the usual section, and so applicable to very large gasholders. The flange of the rail, being riveted to the sides of the holder, makes the ball race a part of the holder, and so each lift becomes, as it were, a spiral ball race. The carriage itself consists of a bracket portion secured to the dip of the gasholder or top of the tank, which carries on its front two containers, one above the guide and one below. Between these containers and the rail, the balls are placed, two on each side; and the containers, which are actually small ball races, are so mounted on the bracket portion of the carriage as to give just so much clearance between the balls and the paths with which they come in contact, as to provide limited, yet free, movement of the holder when inflating or deflating. Were the carriage balls and rails to be fitted up on what are called "dead centres," then the action would be exactly that of a ball bearing; but, owing to the elasticity of the holder and the clearances provided, the movement due to wind forces, and that due to the rising and falling of the holder, this condition cannot be fulfilled, and its non-fulfilment is not only recognized, but actually made use of in this carriage.

The top portion of the containers is carried over the top ball, and is brought to a point nearly in contact with the rail, to prevent any foreign substance from getting into the bearing, and the usual arrangements are made for lubrication. The shape of the races formed by the rail and in the containers is so made that their action on the balls is to cause the latter to spin. This spinning action is the essence of the whole idea, and reduces friction to a minimum. Another, and very important novelty must be pointed out. Although, as before stated, clearance is provided for eccentric movement of the holder, yet, as this movement is taking place and approaches its maximum, so the shape of the races resists such movement, and tends to bring the holder back to its central position. The strains on the holder are transferred to the carriages through the balls, and as the balls are in contact with inclined surfaces, it is obvious that they will try to reach their lowest or central position, which acts as an anchor to the holder. It is well known that the effect of the wind on the side of a gasholder causes it to move slightly out of centre; and the carriage is so designed that in checking this eccentricity no additional strain is thrown on either the balls or the carriage. What takes place is that the movement of the holder merely gives the balls another axis on which to spin.

For years some of the best brains in the gas industry have been devoted to the study of spiral holders and their carriages; and the patentee, in entering this field, has been courageous enough to branch-off on a line of his own. We wish him every success. The invention is the subject of a special illustrated article by Mr. A. Gadd in later columns.

Settle's Heat Penetration Tables.

In the discussion on Dr. Weyman's paper on "Increasing the Rate of Carbonization," read at the meeting of the Institution, Mr. W. W. Townsend, of Colchester, referred to Mr. Thomas Settle's Heat Penetration Tables. Mr. Settle has since had a number of inquiries for copies of the tables. He informs us that he cannot possibly supply copies to all who have asked for them; but for the information of those who are anxious to study them, we may recall the fact that the best of the data were published in the "JOURNAL" for Dec. 22, 1920 [pp. 692-4].

Corporation Profits Tax.

All public utility gas undertakings are interested in this subject. In the mass of material published in the "JOURNAL" last week, the reference to it in the minutes of the National Gas Council may have been overlooked. As is well known, the Chancellor of the Exchequer promised that, in the Finance Bill now before Parliament, the exemption of public utility undertakings should be extended to a further three years. Now an attempt is being made by certain members of Parliament to reduce the three years to one. The National Gas Council are going to resist this; and no doubt they will be supported by all the other organizations representing public utility concerns. It is felt that any lessening of the period of exemption will increase the difficulty of raising new capital. Another proposed amendment is one to which strong exception is also taken. It proposes to restrict the exemption to those cases in which an undertaking is not "trading beyond its statutory obligations." This amendment, it is believed, would penalize not only those gas undertakings which work-up their own residuals, but also those which supply cookers, fires, and other appliances on hire to their consumers. In fact, it is thought that the amendment would exclude practically every statutory gas company; and the Council propose to take the necessary steps to oppose it—providing that the amendment is not ruled out of order by the Speaker, which may well happen. It is manifest that, if such an amendment were carried, it would be an extremely serious business.

Gas Coal Position.

From the markets generally, reports come that in respect of gas coal there is a sluggish tendency, and available supplies are in excess of demand. The result of this condition is that there is a considerable competition for orders, and particularly for contracts now that tenders are again being invited. From the Durham coal-field, we have information that the position is such that market quotations have not any substantial value, and that it is fairly easy in these times to get a shilling or two off quotations by a little bargaining, as the colliery owners are not by any means under pressure in respect of fulfilling requirements for this class of coal.

Rating of Machinery Bill.

The report stage of this Bill was reached in the House of Commons last Friday. It will be remembered that its object is to provide that machinery which is portable shall not be taken into account in making assessments for rating purposes. A new clause has been added which provides that the Bill shall not come into operation till April 1, 1926, in order that its application shall await the next quinquennial period, and thereby avoid the necessity of re-assessment.

Fertilizers.

Sulphate of ammonia exports this year do not seem able to move up to those of 1921. The quantity exported in May was 4725 tons, as compared with 6109 tons in May, 1921. In the five months the total was 55,149 tons, which is 10,695 tons less than in 1921. By the way, the nitrate people are looking upon the prospects of next season as favourable, owing to the scarcity of sul-

phate of ammonia. They must not overlook the fact that, with the re-starting of the engineering industry and the general improvement in the industrial situation, more bye-product coke-ovens will be put into commission, and the output of sulphate of ammonia will consequently be increased.

Gas Coal Exports.

Out of a total of 5,057,230 tons of coal exported in May, 729,274 tons were gas coal, the value of which was £816,885, or a shade over £1 2s. 4d. per ton. There were 6547 tons of gas coal exported in May, 1921 (coal stoppage period); and the value was £13,457. In May, 1920, 191,956 tons were exported; the value being £849 683. In the five months of this year, 3,185,595 tons of gas coal were shipped; in the corresponding period of 1921, 948,352 tons; and in the five months of 1920, 947,549 tons.

Gas Coke Shipments.

In May, 23,742 tons of gas coke were sent abroad, the value being £33,049; in May, 1921, the quantity was 17,261 tons, with a value of £30,812; in May, 1920, 34,172 tons, with a value of £200,397. In the five months this year, 293,350 tons were shipped; the value being £442,456. The corresponding period of 1921 saw 217,603 tons exported, having a value of £562,383; and in the like period of 1920, 297,140 tons were sent abroad—the value being £1,451,921. An average of £1 10s. 2d. per ton was realized in the five months this year; an average of £4 17s. 8d. per ton was obtained in 1920.

WALTER KING, LTD.

Mr. Bezant's Service.

To fill the vacancy on the Board of Walter King, Ltd., caused by the death of Mr. Walter King (the first Chairman of the Company), Mr. Walter Rupert King, his elder son, has been elected a Director.

At a recent meeting of the Board so reconstituted, the other members—the late Mr. King's sons—invited Mr. Arthur F. Bezant to take over the Chairmanship of the Company, before the reversion of the office to a member of the late Proprietor's family. He has consented to do so for a period. It is felt that his many friends in the industry will unite in congratulations to him on this recognition of his many years of devoted service to the gas industry and the "JOURNAL."—CLIFFORD A. KING.

Avoiding Spontaneous Combustion.

Mr. J. E. Williams, of Waterbury (Conn.), has described in the "Electrical World" a method of storing coal to avoid spontaneous combustion. He says that the secret of preventing coal-piles from catching fire in this way lies in the manner of building-up the piles. The following of these two simple rules will go a long way towards preventing fires: (1) In unloading coal with buckets, drop the load in a bulk. Do not let it trickle out into cone form. (2) Build the pile in flat layers. Explaining these rules, he goes on to say that in building-up the layers of coal, one should proceed as if building a brick wall. Drop the first load flat in a bulk; lay the next load close to the side of it; the next to the side of that; and so on, until one layer is completed with a flat top. This keeps the mixture of fine and course coal together; whereas if the coal is allowed to form cone-shape the heavier pieces roll down the sides, leaving the fine coal at the peak. Through the heavy coal at the bottom and sides air will enter, and may set the whole pile on fire; but by building the pile in layers, this separating of the fine and the larger pieces is prevented, and the air will not filter through so easily. For use, take a layer off the top and build-up as before, not forgetting that the secret lies in keeping the surface flat, and avoiding internal cones. Mr. Williams admits, however, that some coal will catch fire no matter what precautions are taken.

The Late Mr. Walter King.—During the past week, many further letters of condolence for the loss of our late Chief have been received. Will those who have so kindly written please accept this as a most sincere acknowledgment? Representative of the rest is the following by Mr. J. Ferguson Bell: "The late Mr. Walter King served the gas industry faithfully and well. His high character, unswerving honesty of purpose, and eminent abilities raised the "JOURNAL" to an acknowledged position of power and guidance at critical times towards a progressive policy in the administration of the industry to which he devoted so many years of unstinted service. We mourn the loss of a true friend, one who was ever ready to serve, and at all times anxious to promote, the best interests of others, regardless of his own."

PERSONAL.

Mr. HAROLD C. SMITH has been appointed Chief Engineer of the Tottenham Light, Heat, and Power Company as from the 1st inst. He was formerly Works Superintendent at Willoughby Lane.

Mr. S. MAULE GUTHRIE, of Brechin, Coalition Liberal candidate, was on June 21 returned unopposed for Moray and Nairn. Mr. Guthrie (who is 49 years of age) is a son of the late Mr. James Guthrie, banker, Brechin, a grandson of the eminent Free Churchman, the late Rev. Dr. Thomas Guthrie, Edinburgh. He was elected Provost of Brechin when he was about 30 years of age, and also held office for some years as Town Clerk. He served during the war as an officer in the Black Watch, and latterly as commander of the British Camel Corps in the Soudan. He acted as Secretary to the Brechin Gas Company, Ltd., for some years, and has been Chairman for over two years, being elected to that position on the death of his father, Mr. James Guthrie, who held the office of Chairman for a considerable period.

At a special meeting of the Bourne District Council, under the presidency of Mr. Arthur Wall, selected candidates were interviewed for the post of Gas Manager, which has been rendered vacant by the resignation of Mr. H. BLOODWORTH, the appointment being unanimously given to Mr. JESSE ROSE, at present Assistant Manager at the Uttoxeter Gas-Works. Mr. Rose, who is a native of Sleaford, started his career at the Sleaford Gas-Works, subsequently obtaining a position at Harpenden. After serving for a brief period at Sunderland, he entered upon his present office at Uttoxeter. Serving at the outbreak of the war as a private in the North Staffordshire Regiment, he was twice wounded. He was promoted to Lieutenant's rank, and discharged in November, 1919, when he resumed his work in Staffordshire.

After twelve years' service with the Wellington (New Zealand) Gas Company, Mr. ARCHIBALD DOUGALL (Chief Engineer) has, as intimated in the "JOURNAL" recently, resigned his position. In connection with this event, representatives of the various departments met Mr. Dougall and made him a handsome present from the whole of the Gas Company's employees. The presentations took the form of an afternoon tea and coffee service for Mr. and Mrs. Dougall, and a case of pipes for Mr. Dougall. The principal speakers were Messrs. W. J. Stevens (representing the clerical staff), A. M. Taylor (distribution department), and J. Maloney (representing the workmen). They pointed out that Mr. Dougall had erected the present works at Miramar, and had had a most strenuous time during the years of the war, but had nevertheless carried out his duties in such a way as to win the esteem and goodwill of every member of the staff. In returning thanks, Mr. Dougall referred to the cordial relations which had at all times existed between the employees of every department and himself; and, in taking his leave of them all, he wished the Company every success in the future.

OBITUARY.

The death occurred at Birmingham on the 24th ult. of Mr. FREDERICK TURNER, from pneumonia, after a brief illness. He was a very well-known figure in the gas profession. He commenced with the Stockport Corporation under Mr. Jacques, and went to Newtown (Montgomery) as Assistant under Mr. Chester. He was Manager at Ringwood (Hants.) for some years, and in 1891 was appointed Manager to the Chard Gas Company, with whom he remained until 1905, when the works were taken over by the Corporation. Since this time he had devoted his energies to the manufacture and sale of gas burners and appliances, and had spent a great portion of his time in experimenting with inverted burners. Mr. Turner was 60 years of age at the time of his death, and leaves a widow, three sons (who are carrying on his business), and two daughters. He was a member of the Institution of Gas Engineers and of the Southern Association of Gas Engineers and Managers, and was proprietor of the Bottesford Gas-Works, as well as being interested in other undertakings. The funeral took place on Wednesday last. Mr. R. G. Shadbolt (Past-President of the Institution of Gas Engineers) was present.

We are sorry to see recorded in the American Technical Press the death of Mr. EMERSON M'MILLIN, who was well known in connection with the consolidation, financing, and management of public utility undertakings. He did not by any means confine himself to gas; but this industry early claimed his attention, and in the holdings of the American Light and Traction Company, which he founded, gas properties predominate. He was born in Ohio in 1844, and was entirely a self-made man. After serving with the army, which he joined when seventeen years of age, Mr. M'Millin sought employment in a gas-works, which position led him to become deeply interested in chemistry and kindred subjects; and for fifteen years he gave all his leisure to the study of civil and mechanical engineering, chemistry, and geology. About this period he went into the business of iron and steel manufacturing on an extensive scale, which, however, in 1883 he gave up to devote himself entirely to the gas business—acquiring control of numerous small works. As early as 1874 he began reading papers before scientific societies; and a very few years later he had become recognized as an authority on many branches of

science. More than thirty years ago, Mr. M'Millin gradually withdrew from the personal management of gas-works, and took up almost exclusively the financial side of the business, and through banking houses in New York finally controlled several large corporations. One of his successes was in connection with the amalgamation in 1889 of four competitive companies of St. Louis into the Laclede Gas Light Company; and in 1901 the American Light and Traction Company was organized, with Mr. M'Millin as President.

ELECTRICITY SUPPLY MEMORANDA.

IT is evidence of a bad case when one of two rivals in business descends to misrepresentation, and that of a very crass order. "Meteor" of the "Electrical Times" has recently stated that the "leading gas-supply concerns of the kingdom now acknowledge that for lighting electricity has the advantage." In our issue for June 21 we challenged "Meteor" to name those leading gas-supply concerns. He has not done so. But he has taken an opportunity of attributing to Mr. F. W. Goodenough a statement which he never made. The allegation refers to a discussion on gas and electricity which Mr. Goodenough opened on March 9, 1921, at a meeting of the National Association of Supervising Electricians. "Meteor" asserts: "Mr. Goodenough made no secret of the fact that in the majority of cases electricity won the competition for lighting; he was prepared to leave illumination to electricity." Mr. Goodenough did not make any statement of the kind; and we are surprised that any technical journalist should have allowed himself to depart from the paths of fair play and rectitude in this manner. Our report of the discussion appeared in the "JOURNAL" for March 16, 1921 [p. 693]; and there is not a word in it to justify the statement, or anything approaching it, that Mr. Goodenough "was prepared to leave illumination to electricity." Mr. Goodenough has made a very proper remonstrance to the editor of our contemporary regarding the misrepresentation. This is his letter: "It is a pity that you do not reciprocate honesty with honesty. Because I have agreed in discussion that there are sections of the lighting field in which electricity is supreme, while *at the same time* stating that there were other sections of the lighting field in which gas is supreme, and other sections in which the contest is fairly even, you have the audacity to state that I 'was prepared to leave illumination to electricity.' Unless you unreservedly withdraw that gross misrepresentation of my remarks, I must decline to take part in any future discussion with electrical engineers. The electrical industry has a pretty bad reputation for misrepresentation of its competitors—of which to my knowledge its reputable members are much ashamed—but this latest example is outside the limit."

Misrepresentation, and a Protest.

Slipshod Journalism.

The outspoken address of Mr. James Robb to the Wales and Monmouthshire Institution of Gas Engineers seems to have created a little ebullition in many quarters. The electrical journals have taken note of points in it, and have made a sad mess of what they have done. The "Electrician" states that the "Institution of Gas Engineers has been having a joyous time at Cardiff." Of course, the Institution has been doing nothing of the kind. As a body, the Institution has not been to Cardiff, or anywhere near it, for years. Our contemporary proceeds to say that Mr. Robb's presidential address was devoted to the question, "Does the gas industry receive the recognition and respect which from its great importance is its due?" The address was not "devoted" to that subject; it dealt with a great many matters. But our philosophic contemporary does not "propose to assist Mr. Robb in elucidating that burning question, except to say that when it is necessary to devote more attention to pointing out what an industry has done than what it is going to do, the future of that industry is, as the Irishman said, behind it." That, of course, is funny. We do not see that it is "necessary" to devote more attention to what the industry has done than to what it is going to do, nor do we see that it is "necessary" to-day to devote more attention to what it is going to do than to what it has done. As a matter of fact, what it is going to do is developing at a rapid rate. Prices per therm are dropping everywhere. There are some gas undertakings that have got down to 8d., or thereabouts, per 100,000 B.Th.U. A little more thon 29 units of electricity are required to furnish 100,000 B.Th.U. Technical men know pretty well what is going to happen in respect of gas production in the future; and if the "Electrician" will only take the trouble to study the gas member of its own family, it will also learn something about the future of the gas industry, which will enable it to guard against making very stupid blunders about gas. Then it paraphrases some of the things that Mr. Robb said regarding electricity. But we turn to the "Electrical Review;" and there to our astonishment we find that it was not Mr. Robb, but Mr. Octavius Thomas who "thought fit to make a savage onslaught on the electrical industry." Mr. Thomas will be surprised. These instances of gross carelessness are inexcusable. If mistakes are made as to the Institution and as to the person who made a so-called "savage onslaught," then it is possible that much else that is written in the electrical papers is equally unreliable. Of course, Mr. Robb's attack (for which Mr. Thomas has been made the culprit by the "Review") was not directed to the electricity industry, but to the methods of uneconomy that, during and since the war, characterized the work of the Government in the town and district of Chepstow.

Combination of Gas and Electricity.

There is evidence that the combination of gas and electricity undertakings is gradually taking root. It seems to be a matter that has not occurred to many local authorities; but they are now beginning to talk and to think about it. This is something to the good in the interests of economy. We recently noticed the interest that Barry is taking in the matter, and the fact that they had had a report from Sir Charles Bright and Partners, and that Mr. A. Hugh Seabrook had been to Barry to undergo quite a serious interrogation as to the firm's scheme. This included a report on a substantial reconstruction project for the gas-works—a matter that the Engineer had been pressing forward for some time, and which has been adopted. Now we see that the same firm have received instructions to prepare an electricity scheme running in conjunction with the Port Talbot Corporation Gas-Works; and, quite in another geographical direction, the Crowborough District Gas and Electricity Company, Ltd., have asked them to prepare a combined gas and electricity scheme in accordance with the Company's statutory powers. There are other local authorities who are examining the matter.

Joint Action and Individual Thinking.

The Incorporated Municipal Electrical Association has been meeting at Wolverhampton; and there they heard an address by Mr. S. T. Allen, the Engineer of the Corporation electricity undertaking, which contained many wise things, some of which might be marked by men in the gas industry, as well as by those in the electricity industry. The war and the difficulties succeeding it played sad havoc with established trading method and system; and in the electricity industry, as elsewhere, it was necessary to adjust outlook, tariffs, and operations to the conditions of things existing at the time. Economy asks that every industry should do its part in creating demand, because demand increases production, and this lightens costs and the price to the public. So Mr. Allen urges those engaged in the gas-supply industry to do their share in creating conditions that will redound not only to its own advantage, but to that of other industries. "To help to promote the common interests is to assist our individual interests." There is sound and wise counsel in what Mr. Allen says in this respect; and it may be commended to the notice of those administrators of gas undertakings who have not yet awakened to the need of a forward policy in developing the gas-sales business. Another reflection is that "joint action does often bring about what individual action fails to, and the results of joint counsels are far more fruitful of success than heterogeneous collections of views made by individuals without regard to the views of others." But it should be pointed out that joint counsels are not much good unless each member does a good bit of thinking for himself. In the gas industry a large amount of work is done by co-operation and joint counsel; but there is a not small proportion of the gas administrators of the country who are prepared to leave it at that in the comfortable belief that it is quite sufficient. But it is not. Mr. Allen recognizes this when discussing the personal factor. As he says, "Individuals nowadays, perhaps more so than in the past, rely too much upon the opinions or decisions of others, and spend less time in framing in their minds, after careful survey, policies of their own, and on which they can with confidence rely." He has a dig at those committees who will not adopt a progressive policy; and he criticizes the reticence of some municipal authorities in the matter of expenditure on developments. He thinks it probable that to-day money can be obtained by municipalities easier for electricity supply development than by any other bodies; and he further believes that an electricity undertaking is a local authority's best asset. All authorities do not think so. Deficits and rates-in-aid prevent their deceiving themselves. However, he urges that it is of little use for municipalities to say they will develop their undertakings after demands have arisen. They must create the demands by seeing to it that they have ample electricity supplies ready and available in anticipation of requirements. There is one passage in the address with which we do not agree. It has been clearly shown, says Mr. Allen, that increased use of electricity proves a great national blessing, in that it means conservation of our coal supplies either for our own future use or for export. We have not seen this clearly shown, in comparison with other means of conserving coal.

The Domestic Load.

At the meeting of the "M.E.A." referred to in the preceding paragraph, Mr. W. A. Vignoles, Borough Electrical Engineer of Grimsby, read a paper on "Electricity for Domestic Loads." The contribution was interesting, as it is ardently desired by some electrical men to turn the tenants of small houses into profitable electricity consumers. The author advocates the development not only of the lighting load, but of cooking and water heating on the thermal storage plan—cooking because the experience of gas undertakings is that the peak of the cooking load is on Sundays, when the power load is off. But that Sunday peak, which looks so attractive to Mr. Vignoles, varies hugely with different dis-

tricts; and it is probably greatest in the residential areas of industrial centres. It is not altogether a comfortable load with some gas undertakings even with big storage, owing to the fact that the demand is compressed practically within two hours. Electricity undertakings must not generalize over the experiences of gas concerns in this matter of the cooking peak load. If they do, we are afraid some of them would, if they could develop the cooking load to any extent, have a very bad time of it. The argument in favour of the development is carried to some length. Among other things we read—this with some amusement, knowing what we do as to the electrical engineer not always having the final voice regarding the character of the domestic appliances in his dwelling—that "it should be a point of honour with everyone connected with the industry, either from the supply or contracting side, to have no dealings with our friend the gas undertaking." The arguments in the paper are summed up as follows: (1) The domestic load may rise to enormous figures if properly encouraged. (2) A price not exceeding 1½d. for heating and cooking is a satisfactory figure from the consumer's point of view, under present conditions. (3) At this price there is some danger of heavy peak loads developing due to office heating; but supply for cooking at this price will show a substantial profit. (4) A hire scheme is essential to the development of a cooking-load. (5) Apparatus should be let on hire at rentals calculated to cover all expenses, except perhaps in the case of ovens and complete cookers, where, owing to the high cost of the appliances, some help is required from the profits from the sale of electricity. (6) Maintenance of the apparatus on hire must be included in the rent. (7) The department must keep in touch with cooking consumers by periodical calls of some member of their staff. (8) Every member of the staff of an electricity department (and everyone connected with the electricity industry) should live in an "All Electric" house. We should like to know more about costs than are given in the paper—costs of installation, appliances, and hire (including maintenance). Very few undertakings are down to 1½d. per unit; and we know that is not a "satisfactory" price with many consumers. So far as it goes, the argument does not seem very convincing. It looks as though this business means a large outlay for a small harvest.

Hackney and People of Limited Means.

The Electrical Engineer of Hackney has reported on the reference to him as to the best means for supplying electricity for all purposes to persons of limited means, at the minimum of initial cost. His recommendations are alluded to in our editorial columns to-day, so that we will not comment on them here.

"Safety" of Electricity.

The Moor Lane power station of the Metropolitan Railway has been almost completely destroyed by fire, which fire, contrary to electrical hypothesis, had its origin in electrical causes. A circuit breaker blew out, owing to a heavy load on a train. The fault was remedied; but no sooner was this done than the dynamo expressed, by a storm of sparks and dense smoke, its discontent with things in general. Then matters took the electrically normal course; and the power station was put out of commission, being, in fact, practically destroyed.

Electricity Supply Bill.

The Electricity Supply Bill is apparently going to have a bad time of it when it reaches the Committee stage. We have not kept count of the sheets of amendments; but, if they were all pressed and passed, the Bill facially and materially would not be the measure that was contemplated by the Government.

NATIONAL PHYSICAL LABORATORY.

Annual Inspection—Atmospheric Humidity and Heating Methods.

The annual inspection of the National Physical Laboratory at Teddington, with the customary reception of a large number of guests representative of the leaders in science and technology, took place on Tuesday, the 27th ult.

The guests were received by Sir Charles S. Sherrington, G.B.E., Waynflete Professor of Physiology in the University of Oxford, and President of the Royal Society, and by Sir Joseph E. Petavel, K.B.E., D.Sc., the Director of the Laboratory. The interest of visitors was largely directed to the extensive equipment for the investigation of problems in aerodynamics, and to the William Froude tank for the testing of model ships, propellers, &c. Among matters of more immediate concern to gas men, however, may be mentioned a new Ransome mixing plant for the production of bituminous road surfacings, for the testing of which there is a circular track traversed by wheels under definite loads and speeds. These wheels, however, are iron-tyred, whereas the road traffic of the present day is mostly rubber-tyred, the friction, impact, and attrition of which on a road surface are of an altogether different character from that of metal tyred vehicles. A remodelling of the testing plant is clearly called for if these tests of road-surfacing materials are to have any real significance from the practical standpoint at the present time.

The Laboratory has in hand a great deal of useful research work in connection with photometry, as well as in the testing of insulating materials. In the engineering department, there are also some investigations in progress which promise to throw more light on the behaviour of lubricants in journals at high pressure and temperatures. These investigations are in continuation of the work done at the Laboratory for the Committee of the Department of Scientific and Industrial Research which has recently issued its report on "Lubrication and Lubricants." Some useful tests are also being made of different types of recording hygrometers, the importance of which as a guide to the maintenance of appropriate conditions of atmospheric humidity in certain factories, mine-workings, &c., as well as in assembly halls, &c., is only now being realized. The discomfort of the "dry" air which electric heaters and many methods of central heating produce is a matter of general knowledge; but the ill-effect of such over-dry air on fabrics, &c., undergoing manipulation in factories is not so commonly understood as it should be. It can be proved by reference to recording hygrometers that the modern gas-fire is pre-eminent in furnishing ideal atmospheric conditions for factories as well as living-rooms.

The growth and development of the National Physical Laboratory have made it impossible to inspect all the matters of direct bearing even on one industry in the course of the few hours of the annual inspection of the Laboratory; and no doubt some of the representatives of the gas industry who were present on the 27th ult. will have noted many points of interest to which we have not been able to refer.

BURNER DEVICES FOR GAS SAVING.

A general desire for the reduction of gas bills has led to many so-called gas-saving devices being patented and sold to the American public. A request was received by the United States Bureau of Standards from the inventor of one of these for a thorough test of the appliance; and in addition to this, there were inquiries from other quarters for information regarding the safety and efficiency of the devices. Therefore a series of tests was made on different patterns, to determine the amount of carbon monoxide produced, as well as the effect on the operation of the burner. It must be understood, they say, that these devices are not, in general, designed with a view to correcting any fault which might exist in the consumer's appliance, with the exception of raising the flame where the burner is placed too far below the top of the stove. They occupy much of the space between the burner and the utensil which is required for the aeration of the flame with secondary air, and also baffle the movement of the products of combustion. Their use invariably causes a spreading and lifting of the flames to such an extent that smothering of the flame results when a utensil is placed above the burner. Under this condition, the combustion of the gas is incomplete, and a considerable amount of carbon monoxide is produced.

The burner used in the tests was of the star type, 1⅜ in. below the top of the grid, and adjusted to average practical conditions; the flame being what is ordinarily considered a good type. Four gas-saving devices were tested—two of cast iron, one of pressed steel, and the fourth of soapstone on a steel frame. They were in the form of perforated plates fitting over the burner. The results proved that there is no justification for the exaggerated claims to economy made for any of the devices tested. As a matter of fact, one particular type, at the smaller rates of consumption (slower rates of heating), did show an appreciable increase of efficiency; but this apparent advantage was completely offset by the odour given off, and the large amount of carbon monoxide produced. From one of the tables given, says the report, it is readily calculated that the concentration of carbon monoxide in an unventilated room of ordinary size soon becomes very dangerous and unhealthy, if any of the gas-saving devices is operated for a short period of time. If several gas-savers are used at the same time, the hazard becomes extremely acute. Indeed, notwithstanding the fact that the tests were made in a large and well-ventilated room, the persons making them suffered severe headaches. With regard to the device consisting of soapstone on a steel frame, claims were made that it would retain heat, and thus continue a cooling process long after the gas was turned off. However, with tests of heating water to boiling, it was found that "the amount of heat required to heat the device far exceeded that imparted to the water after the gas was turned off, so that its use results in waste rather than economy." With the top of the grid 2½ in. from the burner, with each gas-saver the efficiency was higher than with the burner alone; but except with the soapstone device, the rate of carbon monoxide liberation was just as dangerous. The type named did not liberate carbon monoxide at this position; and the efficiency was slightly higher than with the burner alone.

Briefly put, the results of the tests show that no marked increase of efficiency can be effected where devices of the character indicated are used. In cases where the burners are far below the grid, or where the pressure drops far below that for which the burner is adjusted, there is some increase in efficiency, though in no way sufficient to justify the claims to economy made by the inventors. Further, they break-up the flames as they leave the ports, and mix them into one mass, thereby excluding to a large extent the supply of secondary air necessary for complete combustion.

BOYS' RECORDING AND INTEGRATING GAS CALORIMETER.

WE now have nine illustrations of the various parts of the recording and integrating calorimeter which Prof. C. V. Boys, F.R.S., introduced to the gas profession at the annual meeting of the Institution of Gas Engineers. His paper and the discussion were published in the "JOURNAL" last week; and these illustrations will be a valuable elucidating supplement to what will be an historic contribution to the subject of calorimetry.

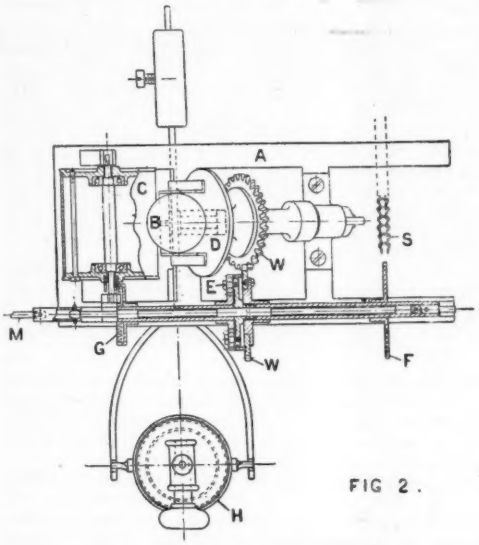
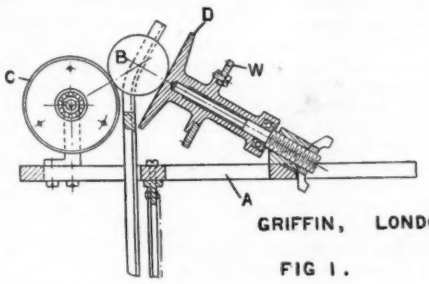


FIG 2.



GRIFFIN, LONDON.

FIG 1.

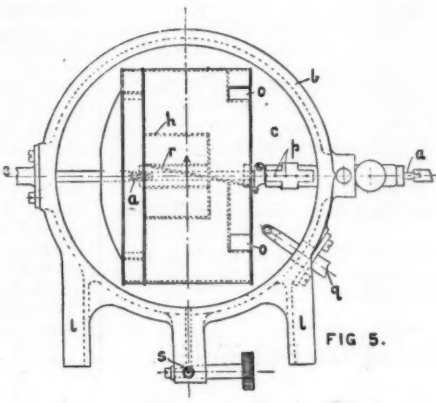


FIG 5.

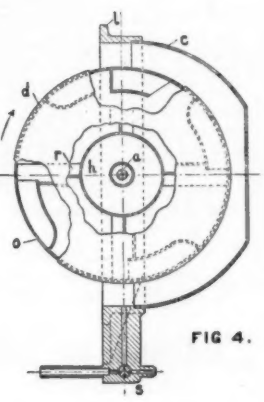
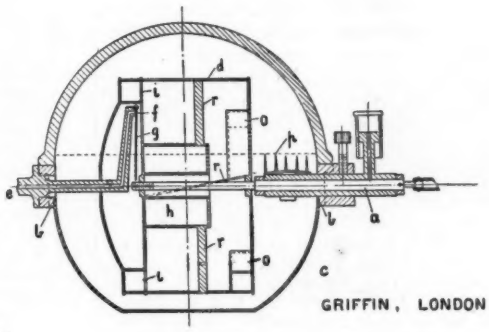


FIG 4.



GRIFFIN, LONDON.

FIG 3.

Taking the figures in their proper sequence—

FIG. 1 is a longitudinal vertical section through the "thinking machine."

FIG. 2 is a plan showing in section the epicyclic construction.

In these—A is the base casting.
B the ball.
C the integrating cylinder.
D the integrating disc.
E the epicyclic gear.
F the sprocket wheel.
G the contrate wheel gearing with the lantern pinion on C.
H the air-bell and mercury trough.
M the broken-off end of the meter axle.
S the sprocket chain.
WW equal wheels with inclined teeth gearing together.

FIG. 3 is a longitudinal vertical section through the meter.

FIG. 4 is a side view of the meter, partly in section, and in part broken away.

FIG. 5 is a plan of the meter.

In these—*a* is the axle.
b the brass ring of the casing.
c the copper bowl of the casing.
d the drum.
e the entrance for the gas.
f the nozzle within the drum.
g the flap controlling the escape of gas from the nozzle.
h the hollow buoyancy chamber.
i the ingress openings of the drum.
l ears to carry spirit level.
o gas outlets from drum.
p points, some below the water-level.
q delivery of gas from meter.
r radial partitions.
s three-way tap for adding or removing water.

FIG. 6 is a vertical section through the calorimeter, showing integrator behind in elevation.

FIG. 7 is a plan partly in section of the calorimeter, with primary levers, bell-crank lever, connecting link and short arm of pen lever.

In these—1 is the cold-water inlet.
2 the cold-water chamber.
3 the hot-water chamber.
4 the hot-water outlet.
5 the cold operative thermometer.

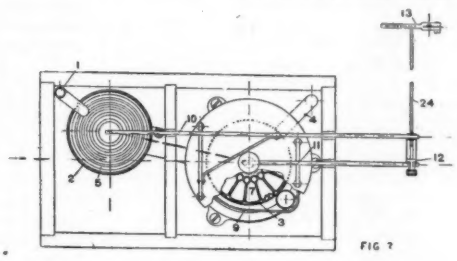


FIG 7

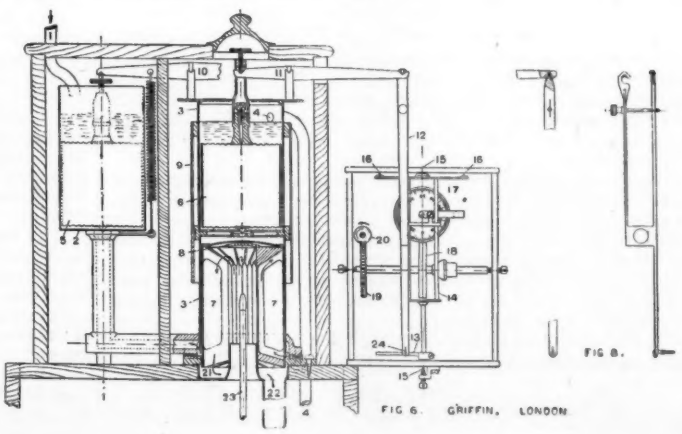


FIG 8.

FIG 6. GRIFFIN, LONDON

6 the hot operative thermometer.
7 the lead heat-interchanger.
8 the silica inner dome.
9 the highly conducting copper shield.
10 the cold thermometer primary lever.
11 the hot thermometer primary lever.
12 the bell-crank lever.
13 the short pen lever.
14 the lantern.
15 the lantern pivots.
16 the upturned points carrying the pen system.
17 the integrating wheel.
18 the integrating drum.
19 the worm wheel turning the integrating drum.
20 worm on cross shaft engaging worm wheel.
21 annular lead trough.
22 lead escape for combustion products.
23 silica tube burner.
24 link connecting 12 and 13.

FIG. 8 is a side elevation, and part front views of bell-crank lever.

FIG. 9 is a photographic view of the whole machine with pumping engine and fan, cooling coil and tank below, and tank and engine governor above.

A JUNIOR GAS ASSOCIATION FOR WALES.

For some time there has been a desire in the South Wales district that there should be a wider opportunity for the discussion of technical and other matters relating to the work of gas undertakings, for the benefit of the younger men interested.

This, as was reported in the "JOURNAL" at the time, was brought prominently before the last meeting of the Wales and Monmouthshire District Institution of Gas Engineers and Managers, when the proposal to form a Junior Gas Association for the area was favourably received, and promises of considerable support were forthcoming. It was agreed at that time that Mr. Octavius Thomas, the Secretary of the Institution, should ascertain what support for such an Association was likely, and that if sufficient interest was signified, a meeting would be called of those desiring to take advantage of the proposal.

So gratifying was the result of this preliminary inquiry, that a meeting was held on Thursday, June 29, with Mr. J. Robb, President of the Institution, in the chair, supported by several important members—including Mr. G. Clarry (Cardiff), Mr. J. H. Canning (Newport), Mr. Octavius Thomas (Pentre), and Mr. D. Muir (Pontypridd); while Mr. H. O. Madden (Cardiff), who was unavoidably prevented from attending, wrote to express his desire to promote the welfare of the venture.

Mr. Robb, on rising to address the meeting, stated that it was gratifying to note that already 100 promises of membership of the proposed Association had been received; and over 60 of the gentlemen sending in their names were present to signify their interest in such an Association. He had pleasure in proposing that a Junior Association be formed, and that steps be taken to organize the Association and arrange the necessary meetings. This proposal was seconded, and enthusiastically received; and a discussion took place which was favourable to the venture.

Eventually it was decided that a provisional Council be formed, in order to draw-up rules and make the necessary arrangements for an inaugural meeting at a later date. The provisional Council which was then formed was representative of the district; the following gentlemen being appointed:

Mr. J. B. James, Cardiff.
Mr. R. Jones, Newport.
Mr. T. Armitage, Swansea.
Mr. J. Wood, Rhondda.
Mr. D. M. John, Aberdare.
Mr. F. W. Thomas, Neath.
Mr. H. T. Lewis, Abertillery.
Mr. G. H. Hughes, Chepstow.
Mr. S. H. Dodgson, Pontypridd.

After the preliminary arrangements had been made, Mr. Robb voiced his pleasure on behalf of the Institution that definite action had been taken upon a subject which had interested both himself and other members for a long time; and he was sure, with the support promised, the venture would have a prominent and progressive future.

Mr. G. Clarry also promised his support, and offered every facility at Cardiff for the meetings to be held—assuring the members that they would have his whole-hearted support.

Finally Mr. J. H. Canning, in expressing his appreciation of the value of Junior Associations generally, assured the meeting that he anticipated a very definite result from future discussions, and that they would be of benefit both to the members taking part and to the gas industry.

Mr. B. J. Bell, Gas Offices, Cardiff, is Secretary *pro tem.*

The late Mr. Richard Henry Jephcott, who was Chairman of the Alcester Gas Company, left estate valued at £5862, with £2710 net personalty.

LOW-TEMPERATURE CARBONIZATION OF COAL.

By S. ROY ILLINGWORTH, M.Sc. (Lond.), F.I.C., A.R.C.S., F.C.S.

[Extracts from a Paper presented to the South Wales Institute of Engineers.]

The low-temperature carbonization of coal aims at the production of a smokeless fuel and of liquid bye-products, which will serve as a home supply of oil. It endeavours to confer a benefit on the community by converting the smoke-producing constituents of coal into oils, thus providing a cleaner atmosphere for people to live in. But unfortunately financial considerations enter into it, and it becomes an economic proposition, the success of which is conditioned by the answer to the query, "Does it pay?" So far it does not. It is useless to think of costing a process on any other basis than the rock-bottom price of its products. In this case we cannot expect more than (say) 17s. 6d. per ton at the works for the fuel, and more than 4d. per gallon for the oils, since such must ultimately become the general prices, if this country is to continue as a going concern.

The margin for the cost of production of a smokeless fuel cannot under a return to more normal conditions exceed (say) 4s. per ton, including standing and overhead charges.

The difficulties which have beset low-temperature carbonization in the past have been threefold:

(*a*) The swelling of the charge, with the consequent porous friable fuel and the difficulty of discharge from the retort.
(*b*) The long period of carbonization required, due to the low thermal conductivity of coal, has in the past entailed a relatively speaking large capitalization per ton.
(*c*) The unmarketable quality of the fuel, due to its friability, and of the "oils," due to the fact that they contain not only paraffinoidal, naphthinic, and allied hydrocarbons, but are associated with considerable amounts of unsaturated and aromatic hydrocarbons. In a word, the oils are neither fish, fowl, nor good red herring, and are of little value for the refinery.

The solution of the problem rests in the first place with the chemist; its successful exploitation is in the hands of the chemical engineer and the business man who realizes what the initial productive operations entail. The chemical constitution of coal is the first plank, the keystone of the problem, associated with which is the problem of the pyrogenetic chemistry of hydrocarbons. Coal is known to consist of four main types of substance:

(1) The alpha compound.
(2) The gamma or resinic compound.
(3) The beta or beta cellulosic.
(4) The ulmin compound.

The alpha compound is devoid of coking properties; it gives rise on carbonization to negligible quantities of hydrocarbons; and its gaseous products are carbon monoxide and hydrogen. This compound does not undergo decomposition below 500° C.; and thus it remains for all practical purposes untouched in the general low-temperature carbonization.

The gamma compound is the cementing ingredient in coal on carbonization. It gives rise to large volumes of paraffinoidal and naphthinic hydrocarbons. This compound melts and confers plasticity on a heated coal. It exists in coal in varying degrees of stability. All forms are decomposed below 500° C.; and certain forms are decomposed below 300° C. For sake of argument, divide these into types having the following stability:

(1) Decomposed below 300° C.
(2) " between 300° and 350° C.
(3) " " 350° and 400° C.
(4) " " 400° and 450° C.

The beta compound has no cementing property; it does not melt; and on carbonization it gives rise to oxides of carbon, water, phenol, but little hydrocarbon. It occurs in coal in varying degrees of stability, which may be classified as for the gamma compound, except that Type 4 does not appear to exist in any quantity.

The ulmin compound is highly oxygenated. It gives rise mainly to oxides of carbon and water. Its occurrence in bituminous coals is negligible.

The various types of coal have been brought together by Seyler in his classification, which is based on the carbon and hydrogen in the ash-free dry coal. This classification can now be given a deeper meaning by the information from the author's researches, which show that the various types of coal are conditioned by the amounts of the four ingredients just enumerated, and by the relative amounts of the various types of beta and gamma compound.

The formation of coke structure arises by virtue of the thermal decomposition of the gamma compound, the carbon skeleton from which functions as the bond holding the individual coal particles together. Coke structure is formed in stages, by reason of the successive decomposition of the several types of gamma compound. Thus the carbonaceous coals are one-stage coals, for their gamma compound is, practically speaking, of one type only, and is decomposed between a short interval of temperature. The effect of the number of possible stages on the product obtained from a coal is largely determined by the temperature gradient under which it is carbonized. If, as is the case in low-temperature practice, a low

gradient be employed, the successive stages are well-marked, and that due to the compounds of lower stability is concluded before the next one is well advanced; but a further factor has to be considered—*i.e.*, the plasticity of the coal mass. It will be realized that if the mass be very plastic, and remains so over the period of the earlier stages, the products arising from these changes will escape from the mass, and thus be non-operative in distending the charge or in causing it to swell. On the other hand, if the mass tends to be very viscous, the volatile matter evolved in the early stages will be entrained and distend the mass. Plasticity is determined by the amount of gamma compound present.

One-stage coals give rise to semi-coke of fair density, and the formation is attended by only a moderate degree of swelling. It is this one-stage type of coal which can be carbonized at low temperatures with some degree of success. One-stage types of coals occur in each species of bituminous coal; but by comparison with the output of bituminous coals, they are only sparsely found in nature. What of the rest—the two and three stage coals? We have only a small stock of one-stage coals suitable for low-temperature carbonization, and so must make all the others into one-stage. That can be done without doubt. The author has converted over forty different two and three stage coals into one stage by a suitable preliminary treatment, and has obtained sound, hard smokeless fuel. The preliminary treatment in essence consists of the elimination of the lesser stable constituents from the coal under suitable conditions which are given by the analysis of the coal. Variations in the coal such as are met with in normal practice are immaterial, since the process is flexible and suitable to all types of bituminous coal *per se*, or to mixtures of coal.

The principles upon which the author's processes are based have been fully tried-out in a small works scale unit in his experimental plant at Treforest. The principles and practice have been proved to be sound. Excellent hard fuel has been made in every case; and a yield of oil varying from 14 to 28 gallons per ton has been obtained, according to the nature of the coal. The swelling of the charge was obviated in each case—in fact, contraction results; and the charge readily slips out of the retort. The gas amounts to between 2500 and 3500 c.ft. per ton. These results have led to the erection of a commercial unit which is now in course of construction.

BLENDING IN LOW-TEMPERATURE CARBONIZATION.

By JOHN ROBERTS, D.I.C., F.G.S., M.Inst.Min.E.

[Extracted from a Paper presented to the South Wales Institute of Engineers.]

The writer's work in connection with the blending of coal and coke dust has been largely devoted to the solution of the difficulties attending the carbonization of coal at temperatures below 750° C. These difficulties are due to: (1) The expansion of coal on heating and the difficulty of discharging the retorts; (2) the development of a plastic layer and a highly-cellular non-conducting zone in the coal when it reaches a temperature of between 350° and 450° C.; (3) the friability of the resulting product. One method of overcoming these difficulties was described in a previous paper, in which it was shown that, by admixing inert material—such as coke breeze—with coal before carbonizing, the swelling of coal is avoided, heat transmission through the charge is increased, and a strong homogeneous semi-coke results. This process has since been adopted by the South Metropolitan Gas Company, who now manufacture a low-temperature smokeless fuel from a mixture of 40 p.ct. of coal and 60 p.ct. of coke breeze; the mixture being carbonized by utilizing the waste heat from the gas-retorts.

This fuel is quite homogeneous in texture, stands transport well, and yields little or no waste. Inexperienced persons can use it for starting-up a fire in the same way as when coal is used. It ignites readily, burns with a straw-coloured flame, and gives out great heat. A fire of this fuel requires no poking, but may be fed every two hours or so. The ash, of which it contains about 6 p.ct., is very fine and light. Consequently it occupies rather a large volume; but it differs from the ash normally found in a household grate in that it contains no unburnt carbon. The volatile content is between 6 and 10 p.ct., and the fuel burns without smoke. For these reasons, this smokeless fuel is much to be preferred to raw coal; and the first bag the writer tested was used with every satisfaction in a grate where it would have been absolutely impossible to burn smoky coal (and live in the room), on account of the state of the chimney at the time.

Though the foregoing process provides an economical means of disposing of the waste coke produced at gas-works and coke-ovens, it is necessarily limited in its application. Therefore other means of preventing expansion of coal were sought. The effect of adding breeze to caking coal is to lower the caking index of the latter. This can also be brought about by oxidizing the coal—a process on these lines having been worked out by the writer in 1920—but it is necessarily a two-stage process. These processes have now been superseded by one in which advantage is taken of the inert character of non-caking coal, and of the fact that when blended with caking coals in suitable proportions a striking effect is produced; the decomposition of hydrocarbons in passing through the outer layer of coke resulting in the deposition of bright carbon in this layer—a particularly bright layer of hard and compact coke surrounds a core of black and more porous material. The bright coke possesses great crushing strength—a specimen 0·85 in. in depth had a crushing strength of 1140 lbs. per sq. in. Some of the faces of each fragment of this product are protected by hard coke, which has the effect of reducing waste in transport. The whole of this fuel ignites very readily, and burns at a uniform rate. The troubles usually associated with low-temperature carbonization are overcome in this process of blending.

In order to obtain the best results in carbonization practice, whether carried out for the manufacture of gas, blast-furnace coke, or of semi-coke, great care should be exercised in the selection and blending of coals. Hitherto mixing of coals has been practised, not so much in order to improve the carbonized products as to dispose of inferior material—for example, non-caking coal. With proper blending, however, it can be shown that the use of non-caking coal is actually advantageous, particularly in the manufacture of smokeless fuel. Non-caking coal is a really valuable national asset.

A NEW RANGE OF "NICO" BURNERS.

In order to meet the large demand which exists—among other purposes, for housing and maintenance schemes—for a cheap type of good class burner, a new range of different sized inverted incandescent burners has been specially designed by the New Inverted Incandescent Gas-Lamp Company, Ltd., of Nos. 19 & 21, Farringdon Avenue, E.C.

There are a standard large size, a standard medium size, a standard bijou size, and a three-light superheated cluster burner. Particular attention is drawn to the first named, as being specially suitable for housing schemes, where one standard size of glassware is desirable, inasmuch as the burner can be supplied with interchangeable nozzles, to take large, medium, or bijou mantles. This range is an innovation on the Company's part, and should prove a popular departure; for examination of the burner shows it to be a good one. It is made on scientific lines, and has been designed to secure efficiency.

While drawing the attention of readers to this new range, mention may be made of the fact that the Company are arranging a general price reduction for their goods; and, while taking this step, they will in future supply all their gas-fittings made from solid-drawn tubing.

Brotherhood Crude Oil Engine.

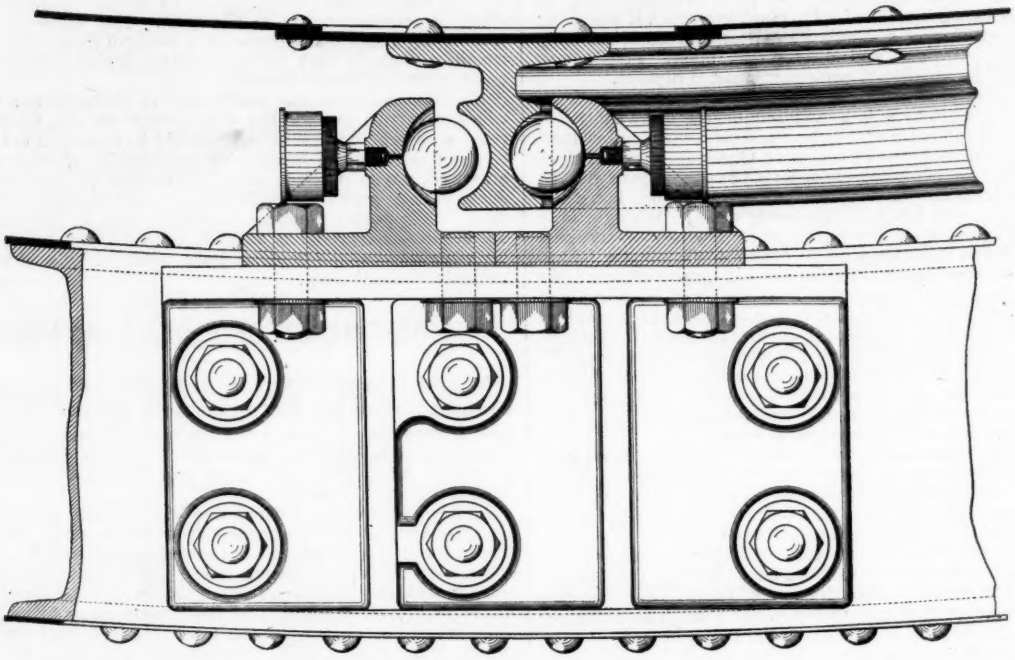
A cold-starting crude oil engine constructed by Messrs. Peter Brotherhood, Ltd., of Peterborough, is described and illustrated in the current issue of "Engineering." It is pointed out that with this engine the use of a higher-grade fuel for starting-up, before turning-over the machine to the regular fuel, is not necessary. On starting with compressed air, the Brotherhood engine is supplied at once with fuel oil of the quality used in running. In fact, it is stated that any fuel which can be pumped can be used—such as tar oils. The engine is of the horizontal four-cycle type, generally on the lines of the Brotherhood standard gas and oil engines. Great care has been devoted to the design of the exhaust valve and valve gear. All sizes of this type of engine are fitted with an outer bearing; the crankshaft and camshaft bearings being ring lubricated. The engine is governed on fuel; the supply being varied in accordance with the position of a vertical wedge block controlled by the governor. The pump can be primed without interfering with any connection. All that is required is to give the plunger a few forward and backward movements by rocking a short bar fitted temporarily into a socket above the swinging lever. The cam is provided with slots and set screws, and can be advanced or retarded to suit the quality of fuel used. In order to eliminate irregularity of governing due to the skew gear drive from the camshaft, the governor drive is provided with some flexibility. This is introduced by means of a spring, which is fixed to the skew gear pinion, and drives by its other end the governor spindle. Any shock or reaction of the camshaft is thus taken up, and is not passed on to the governor proper. This form of drive enables a very light and sensitive governor to be used, and permits governing between extremely close limits. The engines are made in single-cylinder sizes ranging from 20 to 150 B.H.P., and up to 300 B.H.P. with two cylinders.

Discussion on the Life of Gas-Meters Committee's Report.—In connection with his remarks on the Life of Gas-Meters Committee's report at the recent Institution meeting [see last week's "JOURNAL," p. 839], Mr. A. W. Glover, of Messrs. George Glover and Co., Ltd., writes to point out that the word "rejected" appears twice, instead of "originated." The sentences should read: "Mr. Parkinson, in his introduction, gave too much credit to the Society of British Gas Industries, in suggesting we had originated this section [section *f*]. As a matter of fact, it was originated by the Life of Meters Committee themselves, by the fact that inquiries had been received from various gas engineers, as shown in paragraph 1 of this section, and questions were asked as to what rentals should be fixed for the new standard meters, and what size meters should be fixed for any particular demand."

R. W. BROADHEAD'S AXLELESS BEARINGS FOR GASHOLDERS.

(Patent Applied For.)

By A. GADD, F.R.M.S.



SECTIONAL PLAN OF NEW CARRIAGE.

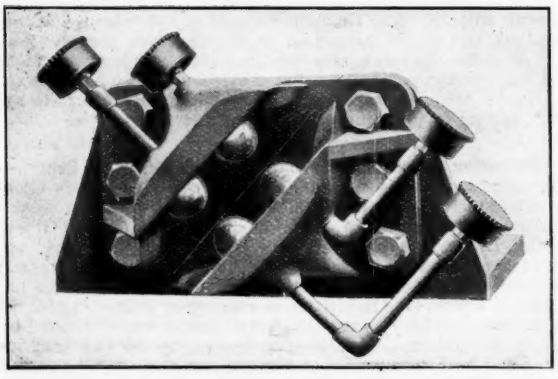
OF late years probably no part of a plant has had the inventive faculty of the gas-plant engineer concentrated upon it to a greater extent than the gasholder itself; and, having regard to its nature and size, it was only natural that resulting innovations should be largely concerned with the lateral support or guidance of the structure. The records of the Patent Office bear ample evidence in support of this statement, more especially with regard to spiral-guided holders. Each patentee endeavours to simplify or strengthen the guiding principle of this type of holder.

A recent and decidedly important development in this direction is the introduction of revolvable bearings, which are in the novel condition of being without mechanical axles. Of the various possible forms of fulfilling this condition, the bearing, which is spherical—such as a steel ball—will probably appeal most to the mechanical mind. As the introduction of ball bearings to line shafting considerably reduced the power required for driving and promoted smoother running, so it would appear that the spherical or steel-ball type of bearing should considerably reduce friction while the gasholder is rising or falling, and promote smoother working. The character of the spherical bearing necessitates a carrier or carriage of a particular type—that is to say, instead of having apertures through it forming axle supports, the carrier is merely provided with one or more pocket-like cavities at its outer surface, within each of which a steel sphere is free to revolve. It is obvious that such pockets must be specially designed for the work they have to do, and have sufficient clearance and be of such a shape that the steel balls will freely revolve within them. Such a carrier when formed as, or bolted to, a fixed carriage results in a very rigid and solid structure, so that resistance to the load upon the spherical bearings is very effectively supplied. Also a carrier so provided may readily be mounted in the requisite inclined manner, whereby the revolvable axleless bearings in it are in suitable position for making contact with the side or head, or both, of a guide for the spirally-guided holder.

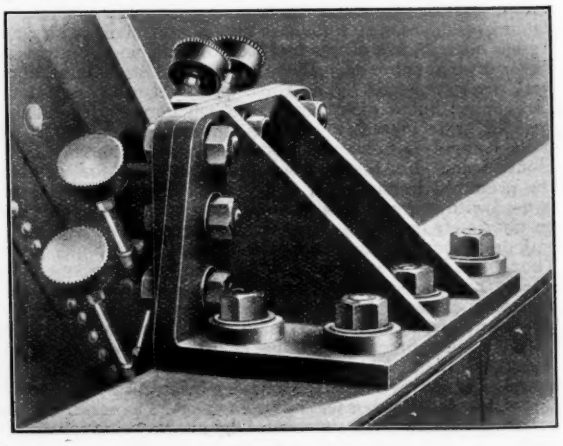
Special sections of guides may be preferable to get the greatest benefit from this type of bearer, and such a section has been evolved having a double groove on each side which is a most interesting innovation. The outer groove in which the bearing engages is of greater radius than the bearing, and not only forms a channel for the bearing, but allows of lateral movement—due to distortion of the holder sheeting under wind pressure, or to expansion and contraction according to temperature—without interfering with the effectiveness of the engagement.

The other groove nearest to the gasholder sheeting can be utilized to convey rain water from the crown or overflow from the cups to the tank without passing down the guiding portion of the rail, thus avoiding contact of overflow water with the bearers. It is also obvious that the double grooved rail adds considerably to the strength of the gasholder side, and tends to keep it more rigid and plumb under all conditions. In conjunction with the solid or rigid formation of the carriages already referred to, the rail becomes a feature of considerable importance.

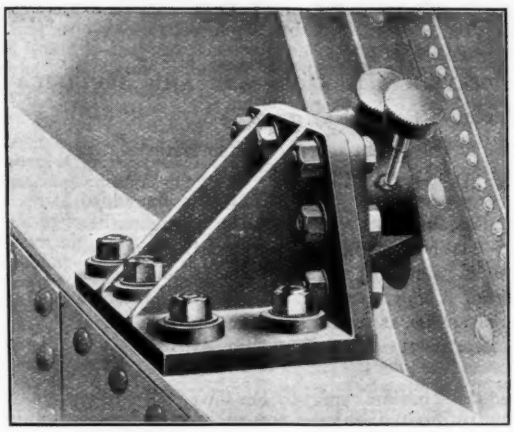
Although a carriage or carrier in accordance with the described development may be arranged to span over a spiral guide so as to have axleless bearings at each side of such guide, it is conveniently divided into two parts for the purpose of simplification in construction and erection, and for facilitating the insertion of



Front View Showing Position of Balls with Rail Removed.



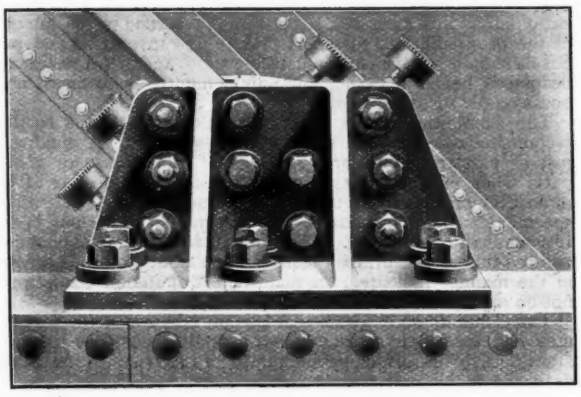
Side View (Left).



Side View (Right).

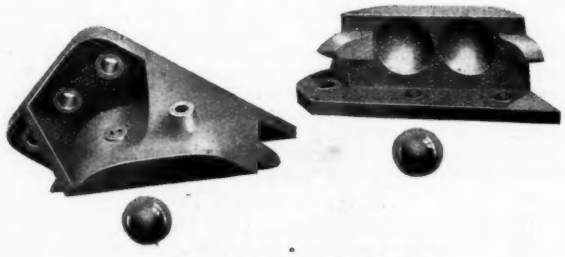
the bearing pieces or spheres prior to final fixture. In this case the two parts are firmly and rigidly bolted to a bracket fixed to the dip of the holder or edge of the tank.

A special feature of the sphere itself is that it adapts itself to varying directions of thrust upon it, since the specially constructed pocket-like cavity containing it is capable of resisting that thrust at any point in its curved surface. The utility of the sphere where smooth or easy running is required, and its resisting power (varying directly as the square of its diameter) against crushing, are well-known factors in its favour.



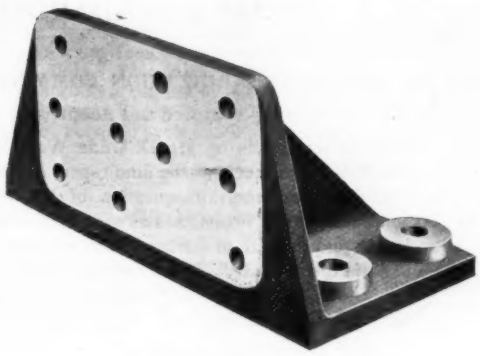
Back View.

It is not essential that the bearings make contact at the sides of a guide; but in those cases where they do so, it is obvious that any thrust or load upon them, and therefore upon the pocket-like cavities in which they are mounted, occurs in close proximity to the bracket to which the carriers are rigidly bolted. The result of this is that bending moments on the parts concerned are comparatively small, and the stresses induced are not at all excessive, even for a normally light construction of carrier. This advantage will be more readily understood if the present type of carriage axle and roller is considered. In this type the thrust from the rail is indirect to the carriage; being transferred *viâ* roller and axle, whereas, with the axleless type, the thrust is direct, being straight through the ball to the bearer or container.



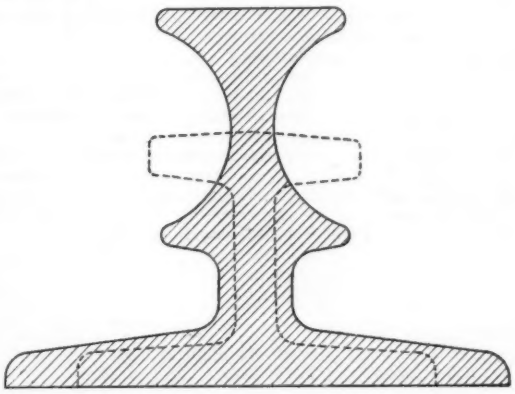
Interchangeable Container and Balls.

Nevertheless, the rigidity of the carriage tends to prevent spreading apart of the bearings or like undesirable strain under abnormal loads during heavy weather in winter time. At such periods, rain, snow, small stones, and other like matter can be largely prevented from passing down the working grooves of the guide rail by the provision of protection hoods at the ends of the carriages above referred to, and which hoods may be fitted with rubbing or deflecting strips, such as lengths of leather or rubber,



Bracket for Holding Containers.

which press against the guides above the positions of the axleless bearings in the carrier cavities. Alternatively, strips of metal or spring steel may be substituted for the flexible ones already referred to, or be employed in conjunction with them, for the purpose of cutting-away any accumulated ice on the surface of the guides.



Section of Rail for Patent Axleless Carriage—75 lbs. per Yard.
[Dotted Lines show the Standard Type of Old Rail Head.

To sum-up, there is no doubt that the type of axleless bearing described is a great step towards that goal of perfection to which every engineer aspires. It has been carefully thought out in every detail to cure the known faults and strengthen the weak points in existing types, and should be heartily welcomed by engineers and managers who are ever looking-out for the best and soundest apparatus.

Research Work on Gas Asphyxiation.

The American Gas Association state that the greatest development in the gas industry along accident prevention lines during the past few years has been the establishment of research work to determine causes and effects of gas asphyxiation, and better means and methods of preventing it or of hastening recovery from its effects. The Accident Prevention Committee obtained from the Association an appropriation for research work; and then the services were secured of a number of eminent physiologists to act as a Commission for research on resuscitation from carbon monoxide poisoning. Laboratory experiments have shown that up to half-an-hour after being gassed, respiration is very much depressed; and analysis of blood samples indicated that during this time very little gas was eliminated. While the investigations have not reached completion, this unlooked-for discovery is said to have opened-up a new and original development that promises to be of great assistance to the gas industry. Elimination of carbon monoxide was not very greatly increased by the use of oxygen, since it was poorly inhaled. When, however, about 8 p.ct. of carbon dioxide was added to the oxygen, the volume of breathing was stimulated 200 to 300 p.ct.; and oxygen then rapidly displaced the carbon monoxide from the blood. Up to the present time investigation has shown that in from 20 to 30 p.ct. of asphyxiation cases coming under the observation of the Research Committee, effective treatment may result in saving life, hastening recovery, and diminishing the injurious consequences. The oxygen-carbon dioxide inhalation virtually precludes any possibility of secondary respiratory failure, and may fairly be regarded as distinctly increasing the patient's chances of escaping serious nervous or other degeneration, which sometimes follows upon gassing. The Committee recommend in connection with gas undertakings the adoption and enforced observance by employees of fundamental safety rules, together with the keeping of proper accident statistics, and the careful training of all employees in resuscitation methods.

THE STANDARDIZATION OF GAS COOKERS.

REPORT OF THE STANDARDIZATION COMMITTEE OF THE NATIONAL GAS COUNCIL AND SPECIFICATION.

[Approved and Adopted by the Central Executive Board, May 9, 1922.]

Mention was made by Mr. D. Milne Watson, when presiding at the recent meeting of the National Gas Council, of the fact that the final report and specification had been issued of the Committee appointed to consider the important question of the standardization of gas-cookers. The Committee, he added, commenced their investigations with detailed particulars of the requirements of the members throughout the length and breadth of the land; and as a result they claimed—and he thought justly so—to have combined in one type of cooker all those features which lead to economy in prime cost and maintenance, efficiency in use, and adaptability to the requirements of the several districts. A copy of the documents has been received from the Council; and it is our intention to publish them *in extenso*, as a serial, in this and subsequent issues of the "JOURNAL."

THE COMMITTEE, SUB-COMMITTEE, AND TERMS OF REFERENCE.

The Committee consisted of the following members nominated by the respective districts:

Name.	Representing the
Mr. GEO. ANDERSON. .	District Executive Board for Ireland.
Mr. A. J. BOND . . .	" " " " South Wales.
Mr. C. F. BOTLEY . .	Southern District Executive Board.
Mr. A. CAUDWELL . .	Eastern " " "
Mr. H. CLARK . . .	Midland " " "
Mr. NORMAN S. COX .	Northern " " "
Mr. JAMES DICKSON .	District Executive Board for Scotland.
Mr. THOMAS GLOVER .	Eastern District Executive Board.
Mr. F. W. GOODENOUGH	(co-opted).
Mr. R. HALKETT. . .	Yorkshire (W.R.) District Executive Board.
Mr. S. E. HALLIWELL .	South-Western " "
Mr. GEO. HODSON . .	Manchester " "
Mr. S. J. INGRAM . .	South-Western " "
Mr. A. A. JOHNSTON. .	London " "
Mr. H. KENDRICK . .	Manchester " "
Mr. J. E. KENSHOLE. .	District Executive Board for South Wales.
Mr. JOHN LANG . . .	" " " for Scotland.
Mr. F. LIVESEY . . .	Southern District Executive Board.
Mr. W. B. MCLUSKY .	Yorkshire (W.R.) District Executive Board.
Mr. R. J. ROGERS. . .	Midland District Executive Board.
Mr. W. J. SANDEMAN .	London " " "
Mr. F. P. TARRATT . .	Northern " " "
Mr. D. MILNE WATSON	(*ex-officio*).

The Sub-Committee who were appointed on Oct. 11, 1920, consisted of the following members:—

Mr. R. J. ROGERS, Birmingham (*Chairman*).
Mr. F. W. GOODENOUGH, London.
Mr. JNO. LEWIS, Newcastle-on-Tyne.
Mr. G. HODSON, Manchester.
Prof. A. H. BARKER, London (University College).
Mr. E. C. HOLT, London (Secretary to Sub-Committee).
Mr. J. G. CLARK, London.
Mr. F. S. LARKIN was subsequently appointed to the Sub-Committee.

The terms of reference to the Sub-Committee were:

1.—To draw up a Standard Specification or Specifications for, and to make recommendations with regard to, gas-cookers, having full regard to:—
   (*a*) Efficiency and utility, especially with relation to burners.
   (*b*) Simplicity of design.
   (*c*) Low cost of manufacture.

2.—To include in the recommendations cookers suitable for consumers using prepayment meters.

An instruction was given that, should the Sub-Committee deem it desirable to seek the advice of any manufacturer, reference should first be made to the Committee.

The Sub-Committee held fifteen meetings, in addition to undertaking a large amount of research work.

REPORT ON THE PROPOSALS FOR STANDARD GAS-COOKERS.

To the Chairman of the Central Executive Board.

SIR,—Following upon a resolution of the Central Executive Board of the Council at a meeting held on Jan. 13, 1920, a Committee on the Standardization of Gas Apparatus was formed "to consider the question of co-operative manufacture and (or) purchase of apparatus, with a view to simplifying and standardizing the designs and reducing the number of patterns in use." On behalf of the Committee, I have pleasure in submitting herewith our first report upon gas cooking-stoves, together with a specification and drawings illustrating our proposals.

A considerable amount of testing and research work has been necessary; and this was delegated to a Sub-Committee, who presented three interim reports. For the convenience of the Central Executive Board, the report now submitted represents, with some slight modifications, an amalgamation of these three reports of the Sub-Committee, as approved and adopted by the Committee on March 15, 1922. It will be seen that the report consists mainly of proposals for the standardization of the gas-cooker substantially in its present form, and that no novel feature has been incorporated. At the same time, it should be pointed out that a large number of novel ideas have received very careful consideration by the Sub-Committee, who have been on the alert during the whole period covered by the investigation for any sound and practical details which could be included in the specification with a reasonable prospect of ensuring satisfaction both to the consumer and to the gas undertaking.

The Committee have borne in mind that standardization, if rigidly adhered to, might hinder development by excluding new ideas which are continually forthcoming; and with a view to anticipating this danger, a suggestion is recorded in the minutes of the proceedings to the effect that all new inventions and proposals should receive careful consideration, and, when necessary, be placed before a permanent Sub-Committee who might meet occasionally for the purpose.

The Committee desire to draw particular attention to their recommendation in the report with reference to the making of master patterns and jigs. The correct interchange of cooker parts when produced by more than one manufacturer is of the utmost importance to gas undertakings, and therefore necessitates special steps being taken to ensure that perfect uniformity in this respect shall be obtained. The Committee express the confident opinion that, unless primary control of the manufacture is secured in the manner indicated, the main object of standardization will not be satisfactorily achieved.

The Committee are aware that certain minor structural details may call for slight modifications; but they consider that any alteration to the principles embodied in the specification is undesirable at the present time.

In conclusion, the Committee wish to place on record their indebtedness to the members of the Sub-Committee for the unremitting attention which they have given to the points they set out to investigate, and their appreciation of the clear and concise manner in which they have recorded the result of those investigations and drawn up their reports and specifications.

(Signed) F. W. GOODENOUGH.
Chairman, Committee on the Standardization of Gas Apparatus.

May 5, 1922.

To the Standardization Committee of the National Gas Council.

The Sub-Committee have pleasure in presenting herewith their complete report on the proposals for the introduction of a standard type of gas cooking-stove, with base stands complete, together with the specification and drawings of the No. 3 size of cooker. This report embodies the Sub-Committee's full reasons for making the recommendations, together with the data of various tests and research work in connection therewith, which was previously included in the interim reports dated March and December, 1921, and February, 1922. Certain research work is still being carried on; but the Sub-Committee are of opinion that the whole of the essential constructional and utility features are now contained in the accompanying final specification and drawings, of one size of standard cooker only—*i.e.*, the No. 3. The specification, however, is so worded as to cover in principle the whole of the proposed series of standard cookers and base stands.

NAMES OF COOKER PARTS.

The Sub-Committee desire to draw attention to the first few pages of the accompanying specification, wherein is given a full list of the proposed names of cooker parts; and they recommend that such nomenclature be applied in all future references on the subject, as much confusion has been caused in the past, owing to the various names given to certain stove parts by different gas undertakings and stove manufacturers.

OFFICIAL NATIONAL GAS COUNCIL BADGE.

A distinctive form of badge is recommended to be cast in the upper portion of the oven doors. Several designs for badges have been considered; and the Committee have included a sketch of

the proposed badge [see Appendix, fig. 6], as it is felt very desirable that an official badge should be adopted by the Central Executive Board to denote that the new cookers have been constructed in strict compliance with the specification approved by the National Gas Council.

CONSTRUCTION.

The question of thermal efficiency of the hot-plate and the oven has been carefully studied, and satisfactory results can be assured without any drastic departure from the present well-known methods of construction, the Sub-Committee having continually to bear in mind, in all their deliberations, the necessity for keeping down, not only the initial cost of construction, but the cost of maintenance which must follow later, and also the possibility of adaptation of the improved hot-plate burners and top grids to existing cookers.

ADVANTAGES.

The Sub-Committee feel that a few of the advantages to be obtained from the manufacture of cookers in accordance with the proposed specification could usefully be mentioned in this report, to enable them to be considered, and weighed, in comparison with the merits and demerits of some of the many existing types of cookers.

They are as follows:—

1.—Reduction and interchangeability of parts, *e.g.*:
- (*a*) Hot-plate taps and gas and air adjustment with all the sizes of cookers.
- (*b*) Oven tap; two sizes only for all five sizes of cookers.
- (*c*) Oven supply-pipes; two sizes only for all five sizes of cookers.
- (*d*) Grill burners; two sizes only for all five sizes of cookers.
- (*e*) Grill frets; two sizes only for all five sizes of cookers.
- (*f*) Grill tins and grids; two sizes only for all five sizes of cookers.
- (*g*) Removable, reversible gate racks for ovens, &c.

2.—The adaptability of ovens—*i.e.*, to low or high base stands at option of purchaser, with oven at side of hot-plate or separately, enabling the oven to be fitted in the scullery, and the hot-plate separately in the kitchen, or *vice versâ*, or side by side where space permits, or as a self-contained cooker on a 4-in. base stand. [See Appendix, fig. 1.]

3.—The positioning of the hot-plate burners, enabling the utensils to be used to the best advantage, with as little waste of gas as possible. [See Appendix, figs. 2, 3, and 4.]

4.—The open type of cast burner grids, enabling higher thermal efficiencies to be obtained from the gas, also taking into consideration time as an important factor in boiling.

5.—The regulation of gas and air with gases of widely different calorific values, compositions, and pressures. [See Appendix, fig. 5.]

6.—Useful oven capacities, compatible with keeping down the over-all heights of stoves and the retention of sufficient space for bread baking, where required.

7.—The facilities offered to those gas undertakings who may require to purchase the standard cookers, but who may insist upon having any of the following, which are not recommended in the specification:—
- (*a*) Straight wrot-iron burner bars.
- (*b*) Cast-iron straight or corrugated bars (single or in sections).
- (*c*) Flame-spreading boiling burners.

8.—Packed or unpacked No. 2 cooker for auto or ordinary consumers, as required.

9.—Aluminium or enamelled steel oven linings reversible, as required.

10.—Oven flue damper operating automatically with the oven tap, ensuring the regulation of the excess secondary air through the oven, but always maintaining a safety margin of 2½ to 3 times the amount required.

11.—All burners, grids, racks, grill frets, &c., removable for cleaning.

12.—All parts accessible for easy maintenance on the district, including the inner crown to oven, enabling the baffle chamber to be kept free from fluff, dust, &c.

Further consideration has been given to the following questions:

PURCHASE OF HOT-PLATES OR OVENS SEPARATELY.

Where gas undertakings may not require to purchase cookers complete, the introduction of the standard types will present an opportunity in many cases for bringing existing cookers up to date, either by applying a complete standard hot-plate to existing ovens or the substitution of boiling and grill burners and top grids in existing hot-plates. Standard ovens could also be fitted to existing hot-plates; and these points may be of considerable interest to those undertakings who may now have the question of fresh purchases under consideration.

STAMPED STEEL PARTS.

If at any time reliable pressed steel parts—such as base stands (or other parts that may lend themselves to the method)—are introduced by manufacturers to the standard dimensions and details, the Sub-Committee at present see no objection to their being included as part of the standard details, provided they are first properly examined and tested on behalf of the National Gas Council.

HOT-PLATE BURNERS.

After further careful investigation and tests, the Sub-Committee adhere to their previous recommendations for drilled ring burners for the hot-plate. They wish, however, to point out that, should any gas undertaking require to use flame-spreading types of ring burners, these may be fitted into the standard hot-plate by special arrangement between such undertakings and gas-stove manufacturers.

ENAMELLED PLATE RACK AND BACK PLATE.

The details of these can be specified after the Council have decided to proceed with the cooker construction.

ASSISTANCE BY MANUFACTURERS.

Conferences were held with representatives of the Stove Section of the Society of British Gas Industries; and much assistance was received from these gentlemen with regard to certain constructional features.

MASTER PATTERNS AND JIGS.

The Sub-Committee suggest the following method of procedure for consideration:

> To ensure perfect standardization of gas-cookers, it will be necessary for a set of standard master patterns to be made; and, in addition, it is most important that standard jigs should also be made, to guarantee proper interchangeability of parts as made by the various makers.

This method is the only one to maintain correct standardization of parts.

STANDARD METHODS OF TESTING GAS COOKING APPLIANCES.

During the Sub-Committee's considerations, certain proposals were submitted by Prof. A. H. Barker for a standard method of testing gas cooking appliances to be introduced to ensure uniformity in this direction. The Sub-Committee agree that such uniformity in testing is desirable; and the proposals which were reported in the interim report dated March, 1921, were carefully considered by the Committee, and have since been referred to the Research Committee of the Institution of Gas Engineers, who will it is hoped, be in a position to tender their observations thereon at an early date.

DETERMINATION OF GENERAL DIMENSIONS.

The general dimensions recommended are based on the result of a careful examination of the returns received from a large number of undertakings in England, Scotland, and Wales. (No actual figures were available from Ireland; but the District Executive Board had previously intimated that no difficulty would be raised in regard to this.)

Greater width is given to hot-plates and ovens to ensure ample operating area; the depths being not unduly restricted.

Due consideration to bread-baking requirements in the North has been given, combined with a general desire to keep down the overall height of the cooker to facilitate general handling, &c. [See Specification.]

RE-MODELLING, CONVERSION, AND/OR CHANGEABILITY OF PARTS WITH EXISTING COOKERS.

The Sub-Committee have borne in mind that (as far as practicable) burners, bars, &c., should be interchangeable with existing cookers, thus keeping down the already excessive number of parts. They suggest that a greater increase in efficiency can be obtained by the adoption of ring burners (drilled at the special angles hereinafter defined by the Sub-Committee), and used in conjunction with the open sectional hot-plate grids. The old types of burners and bars can be gradually replaced (if required) as stoves are brought in from the district and passed through the works preparatory to their being re-issued. The Sub-Committee are of opinion that the question obviously is one that can be best dealt with by each undertaking after the standard cooker is actually produced; and it may even be found possible and advantageous to convert and re-model many of the existing cookers by using parts of the standard cooker.

AMERICAN GAS ASSOCIATION'S SPECIFICATION FOR STANDARDIZING GAS-RANGES.

Copies of the American Gas Association's specification were obtained and carefully examined; but it was found that the whole of the features included had been, or were about to be, reviewed by the Sub-Committee.

RANGE OF SIZES.

Five sizes of cookers are recommended. For ordinary purposes, a range of four sizes would suffice; but there are many large undertakings who have a regular demand for a larger type used chiefly in boarding establishments, large private houses, &c., and a fifth size is, therefore, included in the specification.

BASE STANDS FOR COOKERS.

The Sub-Committee have made inquiries and ascertained that there is an undoubted demand on the part of the public for raised ovens, which raising facilitates the using and cleaning of cookers generally, and saves the bending necessary when cookers are placed on the floor.

The maximum height of the stands is controlled chiefly by the heights of the ovens; but interchangeability has been studied, and the number of stands therefore kept down to three only. The separate stands for oven or hot-plate enables one part to be fitted in the kitchen and the other in the scullery, or both together, where required; space usually being the governing factor.

The purchasing of stands will, of course, be at the option of

any gas undertaking. If they are not required, the cookers can be used without; but the chief object in recommending stands of a definite and substantial height is to ensure the oven being well raised, and not only a few inches from the ground level. [See Appendix, fig. 1.]

In view of the foregoing, the Sub-Committee feel that it will be unwise to suggest any Specification for Standard cookers unless it includes such popular and practical devices to meet the public requirements.

It is further recommended that 4 in. iron base stands be utilized with every cooker issued in future, instead of the stones or composite slabs.

HOT-PLATE CORNICE.

The cornice must necessarily lead to some loss of heat, due chiefly to the following causes:

(*a*) Distance between burners and cornice.
(*b*) Drilling angle of outer ring of flames.
(*c*) Type and size of vessel used over burners.
(*d*) Section of cornice.
(*e*) Type of bars or top grids used with vessel.

Many tests were made confirming this, and to ensure symmetrical distribution of the heat; and to enable moderate-sized vessels (6 or 7 in. diameter) to be used with efficient results, the Committee have specified a definite distance between the edge of each burner and the inner edge of the cornice. [See Appendix, figs. 2, 3, and 4.]

HOT-PLATE BURNERS, CARRIERS, AND CAST GRIDS.

Exhaustive experiments were made before arriving at a decision as to the type of boiling burner to be recommended. All types of boiling burners (including the more recent cone spreading-flame types) were tested on several occasions, and with various gases. They were also tested with and without cast open grids, and also with wrot-iron bars of even and tapered sections; and the Committee were pleased to note that the makers generally have improved the efficiency of their hot-plates during the past two years. At the same time investigation and tests were made of all types of existing boiling burners on cooker hot plates as supplied by the makers, the majority of which were of the older designs; and it was found that the efficiencies varied very considerably. For example, the average consumption of 29 types of burners tested (of ten makers) with cast and wrot bars as supplied was 2·79 c.ft. per quart of water boiled; but the average consumption of six of the newer types of burners aforementioned (placed on the market during the past two years), when tested at rates varying from 12 ft. to 24 ft. per hour, was 2·1 c.ft. with open cast grids. Therefore, by adopting open cast grids and improved design of burners, a direct saving of 0·69 c.ft., or 24·7 per cent. (per quart of water boiled) may be obtained. This is chiefly due to the more intimate flame contact of the burner with the vessel.

With regard to the cone spreading-flame type of burner which is now being adopted by certain British manufacturers, the Sub-Committee finally came to the conclusion that no advantage will be gained by introducing these, as they are no more efficient (when used under actual district conditions) with open cast grids than are properly drilled ring burners when used at the correct distance from the base of the vessel. In fact, with one type of cone spreading-flame burner now on the market, owing to the close proximity of the flame cones to the vessel, it is possible for the cones to become broken, resulting in incomplete combustion and consequent smells. This cannot happen with a properly drilled ring burner set at a distance of 1¼ in. between the top of the burner and the top of the cast grid, as it receives full aeration with any size of utensil used. The breaking of cones with consequent smell has been the cause of much complaint for many years past; and it would be inadvisable to recommend the adoption of any burners so constructed as to make this trouble possible under actual district conditions.

The average result obtained by six of the new types of burners (2·1 c.ft.) is also obtained by the properly drilled ring type of burner, which is recommended by the Sub-Committee; and in view of this type being more simple in construction (produced from a cored casting), the Sub-Committee much prefer it to the cone spreading and other types above described. They also feel that it should be produced by manufacturers as cheaply as the the cone spreading types. Loose parts will also be eliminated, and the possibility of complaints of smell due to imperfect combustion will be removed. Moreover, it is of interest to note that the Committee on Standardization of Gas-Range Specifications of the American Gas Association, in their recent report, definitely exclude all burners of the cone spreading type and with loose parts, adopting in preference thereto drilled ring burners set at a distance of 1¼ to 1½ in. from the bottom of the utensil.

The type of burner submitted by the Sub-Committee will give perfect combustion under varying pressures from 2 to 5 in. and of varying compositions and calorific values from 300 to 560 B.Th.U., all adjustment necessary being made at the injector and mixture regulator when required. The results obtained during one of the demonstrations to the members appear at the foot of the previous column.

BURNER TESTS.

Calorific Value. B.Th.U.	Remarks.
560 . . .	Good working flame; no smothering with kettle in position.
470 . . .	" " " " " "
425 . . .	" " " " " "
385 . . .	" " " " " "
300 . . .	Air chamber totally closed; good results when gas-injector opened.

Pressure during all tests, 3 in.
Injector set at 24 ft. for above tests.
Diameter of burner, 3 in.
Range of consumption, 12 to 27 ft., without firing-back or smothering.

MAINTENANCE OF HOT-PLATE GRIDS.

Inquiries were made as to the maintenanee of cast hot-plate grids where used in fairly large quantities; and the Committee are pleased to be able to report that this is not unduly heavy. On the contrary, they appear to be capable of withstanding some years of wear, with fair and proper use.

WROT-IRON BARS.

Where gas undertakings do not wish to adopt open cast hot-plate grids, it will be possible to utilize wrot-iron bars by fitting cast slip pieces in the recesses formed on the back and front of the cornice of the standard cookers.

The Sub-Committee submit the following particulars of some research that has been made to ascertain the efficiency between wrot-iron bars of even and tapered cross sections.

Rectangular (or even cross section.)
Test—Gas, 2·55 c.ft. Time, 6 m. 55 sec.

Tapered cross section.
Test—Gas, 2·46 c.ft. Time, 6 m. 55 sec.
Saving 0·09 c.ft. = 3·52 p.ct.
for each quart of water raised from 54° to 212°.
Pressure, 3 in. Burner drilled, 30° inner flame and 20° outer flame.

It will be noted, further, that the use of wrot-iron bars considerably lowers the efficiency of the burner as compared with open cast grids. The approximate difference between the two methods of utensil support is shown as follows:

Open cast grids = 2·1 c.ft. per quart of water boiled.
Tapered wrot-iron bars = 2·46 " " "
Difference = 0·36 c.ft.

BURNER CONSUMPTION RATES, &c.

Three sizes of boiling burners are recommended—No. 1 up to 15 c.ft. per hour, No. 2 up to 24 c.ft., and No. 3 up to 36 c.ft. (the latter for the two large size cookers only). Experience in the use of burners of different sizes leads the Committee to recommend three sizes, as cooking on the hot-plate often requires to be expedited, and this cannot be done if the hot-plate burners are all of one small size.

SIMMERING BURNERS.

Stringent tests were made with the No. 1 (15 c.ft.) burner, to ascertain whether simmering can be properly effected (without burning soups, &c.) at the rate of 2 c.ft. per hour; and the results were eminently satisfactory. It was therefore decided not to recommend special simmering burners, but to adopt a larger type (No. 1 = 15 c.ft.), which can be used for heavier boiling if required in addition to simmering, thus utilizing the space on the hot-plate to greater advantage. The wider spreading of small flames for simmering purposes will obviate local heating or burning of foodstuffs.

DUPLEX BOILING BURNERS.

Duplex boiling burners are not recommended, as with properly drilled simplex burners, with a wide range of perfect combustion, better results are obtained. The central section of a duplex or concentric ring burner often causes very local heating, resulting in the burning of foodstuffs—a fault similar to that of some of the special simmering burners. "Firing-back" of duplex burners is often experienced. They are also comparatively expensive to produce, and necessitate an additional cock on the tap rail.

FISH KETTLE OR SAD IRON BURNERS.

The Committee decided not to include any burners of these types in the recommendations. More economical results can be obtained from an independent gas-iron. The grill burners, when turned in the upward position, are more suitable for heating large fish kettles, &c.

HOT-PLATE BRIDGES.

The Sub-Committee do not recommend enclosing entirely the sides of the hot-plate space; the semi-open type lending itself more readily to cleanliness.

HOT-PLATE WING EXTENSIONS.

The Sub-Committee do not recommend these extensions as a general part of the standard cooker. Where specially required, it is suggested that the hot-plate cornice be drilled to accomodate such extension plates by gas undertakings themselves.

HOT-PLATE TAPS, GAS INJECTORS, AIR ADJUSTERS, &c.

Many tests were made in connection with the proposed type of gas adjustment; and this, combined with a satisfactory air-adjusting device [see later], will give proper adjustment with a wide range of gases of varying pressures, calorific values, compositions, and specific gravity. These are to be applied to all sizes of cookers, including those for automatic consumers.

Consideration was also given to special types of tap washers, to

abolish the stop or nighting pins; and this has been included in the tap specified.

"TWO-POSITIONED" TAPS.

The question of the necessity for two or more positions of tap-plug action was discussed; and it was resolved that only one "single-action" type of tap should be recommended, in view of keeping down initial and maintenance costs, &c.

BYE-PASSED TAPS.

Bye-passed taps were considered, and rejected mainly for the same reason.

LEVER-HANDLED TAPS.

Lever handles for taps are not recommended, as they often "tighten-up" when fitted on the top of taps, or fall into the

APPENDIX.

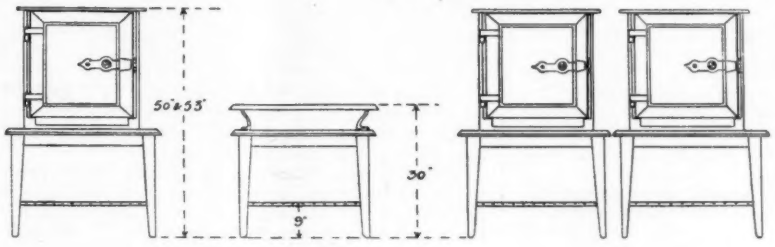


Fig. B.

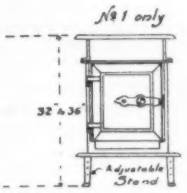


Fig. A.

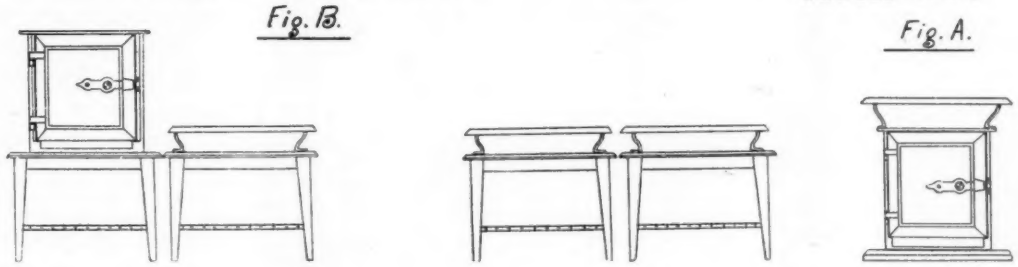
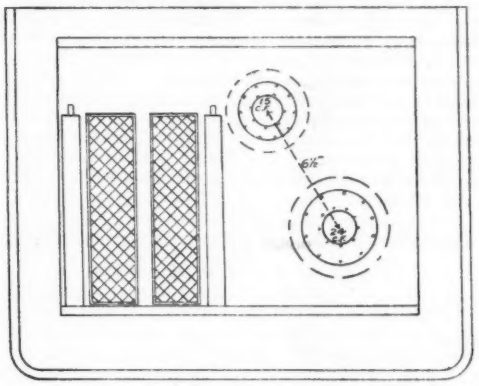


Fig. 1.

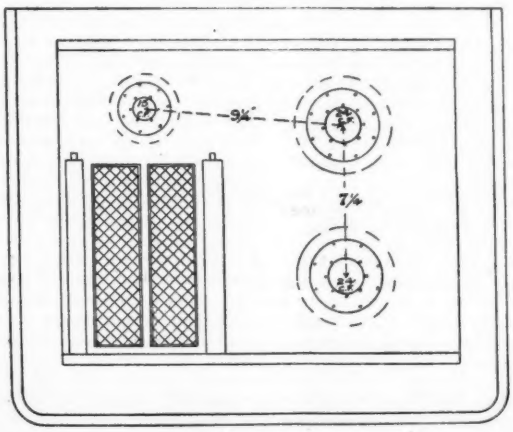
(These sketches are only intended to indicate the various arrangements of ovens and hot plates.)

Hot Plate Settings.

(Dotted circles denote extreme diameter of flames with utensil on.)



№ 1 & 2 Sizes

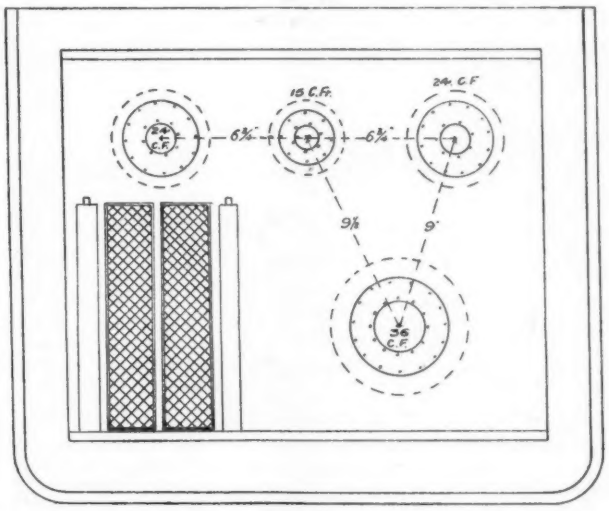


№ 3 Size

Fig. 2.

Hot Plate Settings.

(Dotted circles denote extreme diameter of flames with utensil on.)



№ 4 Size.

Fig. 3.

Note.—Figs. 2, 3, and 4 are drawn to a scale of ⅛th full size.

"open" position, or *vice versâ* when fitted at the side, after becoming somewhat loosened at the plug.

AIR OR MIXTURE (AIR AND GAS) REGULATORS.

The regulation of the primary air supply to bunsen burners is regarded as a very important feature. An entirely satisfactory regulator ought, in the opinion of the Sub-Committee, to fulfil the following conditions:

1.—It should provide ample range of adjustment.
2.—It should be as nearly as possible incapable of accidental alteration—*i.e.*, it should be as secure as possible.
3.—It should leave the aeration unaffected by a possible small degree of latitude that may be allowable in the fit of a burner in relation to the gas injector.
4.—It should be economical to produce.
5.—It should be reasonably reliable as regards wear and tear.
6.—If possible it should be capable of application to existing cookers.

Several designs, operating in one or other of the following methods, were considered:

(*a*) By adjusting the area of the air inlet.
(*b*) By varying the aeromotive resistance of the mixing tube.
(*c*) By varying the air-inducing power of the injector.

Method (*a*) refers to the one that has been employed in cooker-burner construction hitherto. Some of the usual defects of this form have been recently overcome by inserting a stamped brass sleeve into the burner tube, with lug attached, to engage a ratchet principle formed in the burner casting, thus securing the sleeve in a definite position without the aid of set pins, &c.

Method (*b*) refers to an adaptation of a method which has already been in use in connection with the adjustment of gas and air mixtures to gas appliances. We consider it fulfils fairly well conditions 1 to 6 prescribed above.

Method (*c*) [see Appendix, fig. 5] differs from method (*b*) inasmuch as a tapered or chisel pointed pin is fixed as close as is practicable to the gas adjuster, and is so arranged that it can be made to move transversely across the centre line of the gas injector, and so regulate the aeromotive power of the gas injector.

From careful experiments made, this method of adjusting the burner has been found satisfactory. It allows of the aeration being varied over a wide range of gas qualities to meet all gas-cooker requirements; and this can be simply and economically effected.

TAP RAIL.

Various methods of tap rail construction were considered, including cast iron and steel, both of which have their drawbacks. The use of brass shoulder pieces on circular tubes has not always been satisfactory in the past; and it is recommended that cast-iron tap rails be used to get the necessary depth of thread, and suitably strengthened to ensure being properly connected-up with wrot-iron gas-supply piping.

GRILL BURNERS AND FRETS.

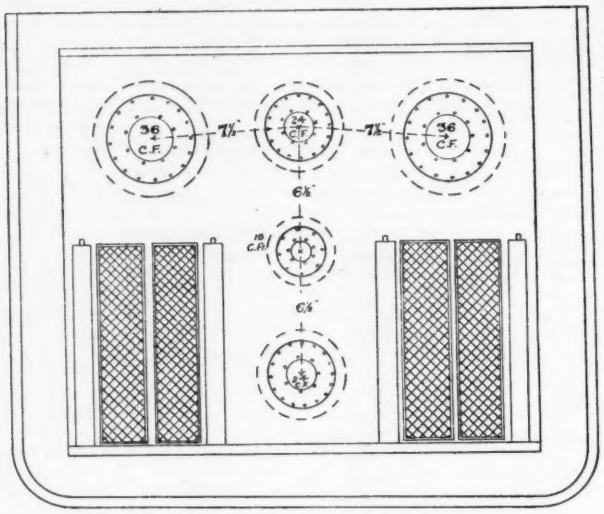
The type of grill burner and frets was the subject of much investigation and discussion, chiefly to ascertain whether fixed burners with removable frets, or fixed frets with removable burners, were more satisfactory in actual practice. It was also recognized that makers had devoted a good deal of attention to this question in the past; and it was finally decided to recommend the use of single poker burners turning on pivots to two positive positions "up" and "down," in conjunction with the double type of fixed frets. The maintenance of such frets was found to be quite reasonable, owing chiefly to one or both of each of the two frets being capable of replacement, by removing the screws and nuts holding them together.

The type of griller recommended may cost slightly more to produce; but better efficiency will be obtained from the burners when turned in the upward (or boiling) direction than would be the case if they were "fixed" and with the "drop" type of frets. Two sizes of grill burners and frets will cover the whole range of cookers.

(To be continued.)

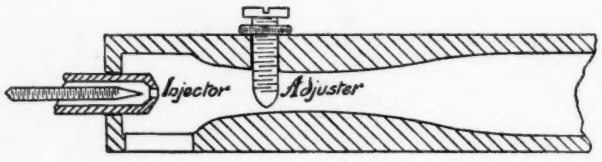
~Hot Plate Settings.~

(Dotted circles denote extreme diameter of flame with utensils on).



№ 5 Size.

Fig. 4.



Proposed Air & Gas or Mixture Adjuster.

Fig. 5.

Fig. 6.

Fig. 5 is not drawn to scale.
Fig. 6 is drawn to a scale of ½ full size.

Annealing Telescope Discs.

In an article appearing in the "Journal of Industrial and Engineering Chemistry," Messrs. Donald E. Sharp and Walter H. Rising, of the Spencer Lens Company, of Buffalo, point out that reflecting telescope discs may be made by casting glass into a suitable mould and annealing. Electric or gas-fired furnaces may be used for obtaining the uniform temperatures necessary; but the gas-furnace has been found to be the more reliable. Special equipment is required for obtaining accurate cooling rates. If reflector discs are made of low-expansion glass, the change of figure in a parabolic mirror due to change of temperature can be minimized. It had been supposed in America, they say, that gas-furnaces could not be used for the careful heat treatment necessary in the annealing of large discs. Consequently an electric furnace was designed by a manufacturer for the purpose; and this, as re-designed by the authors, has proved a success. However, results have demonstrated that the gas-furnace they describe is fully as satisfactory as the electric furnace, and is simpler to control. This furnace consisted of a regular pot-arch, enlarged to accommodate the iron cylinder and mould. The fuel used was natural gas, burned behind a breast wall by means of three burners of the bunsen type. A small track was laid down on the floor of the pot-arch; and a short moveable section of track was so arranged outside as to permit a strong car serving as a carriage for the mould to be rolled in and out of the furnace. The temperature of the furnace was controlled by a special Robertshaw regulator, which consists of a valve actuated by the differential expansion and contraction between a carbon rod and a copper tube. In this installation, the expansion tube extended through the crown and into the interior of the furnace about 8 in. A worm gear and handle served for adjusting the regulator valve, and for determining the temperature. The device has an arbitrary scale; and its calibration must be determined for each installation.

A NEW GAS-METER OF SWEDISH ORIGIN.

By B. TRANEUS, Engineer, of Stockholm.

[A Lecture given before the Swedish Technical Association, Stockholm.]

There has hardly ever been more productive work done in our country in the line of invention than during the war; and the great number of applications for patent rights, the various shows and exhibitions, as well as new plants and industrial undertakings, bear evidence of the fact. This is very pleasing to note—first of all because owing to it we shall be more independent of other countries; our demand for foreign articles previously having been a considerable drawback. Secondly, we have every reason to believe that these new ideas and inventions will result in new industries, which in their turn will help to give us a better position on the world's market when finally the battles of the war will be replaced by, let us hope, less severe battles in the commercial and industrial world. One of the industries which has suffered most under the present conditions is, no doubt, the gas industry. It is therefore to-day a special pleasure to me—being a former manager of gas-works—to have the opportunity of explaining to you a new Swedish invention which seems to have every prospect of easing the difficulties we have had to struggle against in a certain line of this industry—viz., the gas-meter branch.

I want to point out at the very beginning that my interest in this matter is altogether platonic. I am speaking partly as a former District Technical Engineer, and partly as a personal friend of the inventor, who in this way, though not belonging to our Society, will get his invention put before a capable and, as I hope, interested audience. And now I shall get to the point of my subject.

The chief claim of this new gas-meter is that it consists of one bellows only, instead of two as in the case of previous dry meters. The reason for the last-mentioned construction is, as you will perhaps know, that one bellows has to help the other over the "dead point." The same result with one bellows is obtained by a momentary changing of the gas channels. As a result of this action, the regulation of the gas cannot be accomplished by means of slide valves, which would work too slowly; and very fast-moving valves have, therefore, been applied. The bellows is consequently working with a constant speed in one direction, after which it suddenly changes over and works with an equal speed in the other direction. When changing the direction, one might think that a variation in pressure would ensue; but these periodically recurring changes are so small that in this respect the new meter is equal to any other.

The valves consist of leather pulleys, which lie flush with a pressed edge on the bottom of the meter. By means of this arrangement, in the first place absolute tightness is secured; and, furthermore, in spite of the quick movements of the valves, they work noiselessly. Another advantage when using valves of this kind instead of slide valves is that the former, by constant contact with the metal edges, gain in tightness, whereas slide valves, as you know, become slack after having been in use for some time. The sudden changing of the valves is accomplished by means of the bellows, during the latter part of its movement, setting a spring in action; but this cannot act upon the valves before the bellows has returned to its starting-point, as until then they are kept locked. The action of the spring is released when the bellows returns, and causes the changing over.

Another interesting detail is the way in which this movement is transferred from the bellows to the recording mechanism outside the meter. The movement of the bellows is received by a lever, placed in the centre, and at right angles to a small leather membrane. When the bellows is working, this lever produces a rocking movement round a shaft situated on the same level as the membrane. There cannot, therefore, be any question of wear and tear.

The limits of the pendulum being absolutely fixed, adjustment has to be carried out in a way entirely different from that of other meters. Adjustment is secured by variation in the number of cogs on the checking wheel which receive the movements of the bellows. This means that a certain number of such wheels with different numbers of cogs have to be at disposal, which may be thought a little troublesome, but in reality is quite simple. In the first place, the number of different toothings can be restricted to about ten; each wheel having one tooth less than another. Furthermore, a wheel which has proved unsuitable for one meter can be returned to stock, and be used for another meter. The adjustment is so easily effected that, after one single checking off, it is possible to decide upon the toothing required; and the number of measurements, with subsequent adjustments, necessary with regard to other types, is therefore out of the question.

The principal aim of the inventor, when constructing this new meter, was to secure a type suitable for manufacture on a large scale in a factory. The greatest advantage from this point of view is the circular shape of the meter, which makes it specially suitable for casting. By using one bellows, it has further been possible to make the meter considerably smaller, though of the same capacity as other makes. In fact, the relation between the different volumes of an old and new meter of the same capacity is equal to 1:6. All of us are aware of the extensive weldings necessary when joining together a meter of the oblong type. With this new type, the welding is almost restricted to applying a lid to a circular box. What this means—especially during the present lack of tin—is quite evident.

Taken altogether, the meter can be manufactured at a considerably lower price than others of the same capacity. Consequent upon the high capacity, it follows that the meter is able to replace all smaller types, from 2 up to 10 lights. This shows that it would be an obvious advantage for the gas-works, as well as for the manufacturers, to rid themselves of the great number of previously-used constructions.

Another advantage which I should not omit to mention is that the recording mechanism is provided with running numbers, which considerably facilitates the reading of the meter, and enables it to be done in a quicker, as well as more reliable, way than when using dials with rotating hands. This arrangement also offers facilities to the gas consumer for checking the meter himself, which fact is rather important.

The meter can also be provided with an extremely reliable automatic apparatus, which is entirely different from any previously known arrangement. The principle of this is that a "pulley" is turned round one revolution when gas worth (say) 1s. is consumed. During this action, a lever is resting against the periphery of the pulley in connection with the stop-valve. When the pulley has moved one revolution, the lever slides into a slot in the pulley; and the movement effects the cutting-off of the gas. If several coins have been put in, they slide into the slot one after the other, thus preventing the lever from clutching—*i.e.*, preventing the turning-off of the gas. From the pulley the coin slides into the cash box, when the consumer has obtained about one-half of the corresponding quantity of gas. The slot holds about ten coins; and there is no need for a counting machine in the matter of prepayment, as the coins are visible through a glass. The money slot is provided with an outlet for returning coins that are too small. Consequently there is no need for a counting machine in connection with coins having passed through the mechanism down into the cash box, as the construction of the mechanism prevents the possibility of non-communication between the number of coins and the quantity of gas consumed.

The above-mentioned pulley is driven by one of the shafts of the counting mechanism. In case of a change in the price of the gas, it is only necessary to alter the gear between this shaft and the pulley by an exchange of two cog wheels. This alteration can be made to an extent of (say) 2500 to 500 litres per coin—corresponding to a variation in price of about 400 p.ct., which must be considered sufficient, even during the present uncertain times, when the price of gas is often fluctuating. The exchange of these wheels does not occupy more than about a minute, and can therefore be done on the spot without moving the meter. It is equally simple to put the automatic mechanism out of action, as for this purpose it is only necessary to remove one of the above-mentioned wheels, when the pulley remains inoperative, and thus keeps the valve constantly open.

The construction of the counting machine will not allow any back-sliding leading to eventual cheating. The cash box is locked to the meter by means of a cotter-pin, which at the same time, in a very simple way, makes sealing possible. In the matter of outward appearance, the automatic mechanism seems considerably more a constructive part of the whole meter than other automatic machines, which nearly all look as if they were attached to the meter without actually belonging to it.

On account of its relatively simple construction, this new automatic mechanism, as well as the meter itself, ought easily to compete in price with any previous make. The weight of the meter, together with the mechanism, is only 2½ kilos—or only one-quarter that of the old meter with its automatic machine. This very slight weight has led to a new proposition with regard to installing the meter; and I will take the opportunity of explaining this. The suggestion is that the connections to and from the meter should be screwed into a piece of casting material attached to the wall. The inlet and outlet of the meter are then coupled to this casting, and the meter becomes suspended from it. Eventual strains upon the connections will therefore not affect the thin walls of the meter, but be received by the casting.

There are several advantages in this method of fixing. First, it is possible to save the at present exceedingly expensive lead tubing; secondly, the shelf hitherto used for the meter is no longer necessary; and, finally, the whole arrangement looks much neater and more compact. The appearance of a meter may seem to be of no importance; but every specialist in this line must admit that the previous way of installing a meter has been far from satisfactory, as compared, for instance, with the arrangement of an electric meter.

Another idea which should be put forward for discussion in this connection is that the capacity of the new meter will be given in cubic metres, instead of, as previously, in lights. I need not explain the reason why the number of lights has nowadays absolutely no bearing on the matter. This expression is merely a survival of the time when gas was only used for lighting purposes in flat-flame burners. It would therefore be a very good thing indeed if our country could take the lead in ridding ourselves of the number of lights as the measurement of the capacity of a meter.

Finally, I would like to allay fears that may be felt by conservative specialists, who may perhaps think that the meter presents several novelties which have not yet been proved satisfactory by experience. The essential details of the meter are based upon old and well-known principles. The gas is measured in the usual

way by the movements of a bellows, for which the same kind of leather and the same oil are used as formerly. True, the changing-over of the gas inlet is not made by slide valves, as previously; but the use of leather for tightening gas-valves is an old idea.

The new meter referred to in the preceding translation is, we understand, to be exploited in this country by Messrs. Stromwall & Co., Ltd., of Nos. 40-42, Queen Victoria Street, E.C. At present only two meters are on trial in this country; but a fresh consignment is expected shortly.

GROWING GAS SALES PER HEAD.

Official returns to the United States Geological Survey show that the increase in the sales of gas from 1918 to 1920 was 100,000 million c.ft.; but even more noticeable has been the growth in the sales per head of the population. In 1918 there were sold 3683 c.ft. of gas for each man, woman, and child in the United States; while in 1920 the figure increased by 950 c.ft. per person, to a total of 4632 c.ft. This shows that within a two-year period there has been nearly a 25 p.ct. increase in the demand for manufactured gas, taking the population of the country as a whole.

Analyzing the statistics, Mr. R. S. M'Bride points out that coal-gas sales in 1920 were substantially the same as two years before; but gas made from coal in bye-product ovens was sold in 1920 to a much larger extent. Thus the total of coke-oven and coal gas for the later year was very much greater than during any earlier period. Also water gas and oil gas both show increases. An increase in the average sales per establishment results not only from the increase in total demand, but from the fact as well that there were eighteen fewer plants operating in 1920 than were sending out gas two years before. In this he sees the result of the tendency to transmit gas greater distances, and particularly to supply gas to suburban sections from central city works.

Of the total income from city gas plants, only slightly more than 6 p.ct. of the total value of gas and bye-products is represented by the value of the bye-products; and in this connection it has to be remembered that water-gas and oil-gas plants do not have ammonia or coke for sale. In the case of the bye-product coke industry, the conditions are quite different; for there only 8 p.ct. of the total income from sales of coke, gas, and other bye-products is from the gas sold. About 15 p.ct. comes from other bye-products, and over 75 p.ct. from the sale of coke. "These relations," comments Mr. M'Bride, "which are well known to the industry, are often ignored by those who occasionally consider the tendency for bye-product coke installations to supply gas for public utility purposes. Ignorance of these facts often leads to an exaggerated idea of how fast the coke-oven is going to replace other types of gas-making equipment." More gas is made in bye-product coke-ovens now than in all other kinds of gas-making equipment combined; but slightly less than one-half of the total sales of gas comes from this source, because a large percentage of gas so made is used for heating the ovens, &c.

Touching upon efficiency, the particulars show that the unaccounted-for gas has decreased very much in the two-year period from 1918 to 1920. The latest figures show an average of 8·2 p.ct. In many other particulars, the efficiency of the industry indicates marked improvement. The yield of coal gas per ton carbonized was 3 p.ct. greater in 1920 than it was two years before; and simultaneously with this increase in gas yield there was a 2·7 p.ct. increase in coke yield. Water-gas plants showed corresponding improvement in operating results. In 1920, the coal-gas tar yield averaged 10·9 gallons per ton of coal carbonized, while the water-gas tar produced was 0·154 gallon per gallon of oil used.

Royal Sanitary Institute Congress.—As previously intimated, the Royal Sanitary Institute will be holding their thirty-third congress in Bournemouth from July 24 to 29. In addition to a visit to the gas-works at Poole, with a reception and tea by the Bournemouth Gas and Water Company, a discussion is being arranged on "Modern Practice in the Manufacture, Distribution, and Utilization of Gaseous Fuel, with special reference to the Public Health and the Gas Regulation Act." Prof. Leonard Hill, M.B., F.R.S., is to give a popular lecture on "The Value of Clean Fresh Air."

The Action of Cyanamide.—It has, says the "Pharmaceutical Journal," been observed that persons working with cyanamide are attacked by fleeting exanthemata of the head and chest. The breathing becomes rapid; the heart's action increases; and there is low blood pressure. The attack lasts an hour or two; and the curious feature of it is that it only comes on when the patient has consumed alcohol in some form. It has been thought that alcohol increases the toxic effect of cyanamide, which is by itself considerable; but this is not the case. Cyanamide is able to energize the action of a number of substances—such as chloral hydrate, sodium bromide, theobromine, &c. For example, if a guinea-pig be given a small amount of sodium bromide, which is physiologically inactive, followed by a small dose of cyanamide, there is an immediate action as if the animal had been poisoned by a large dose of bromide.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Strictures from the Welsh Meeting.

SIR,—In reply to Mr. Goodenough, I beg to say that, after reading his letter through, I look upon it as a half-hearted apology—when read between the lines and the invisible ink. However, I can assure Mr. Goodenough I am a sincere supporter of the "B.C.G.A.," and intend continuing so, as it has done good work in the past, and will do good work in the future. What seems to vex him is that I should do what I did at a public meeting, and the use that may be made of it by our competitors. If such fears exist in the minds of the Executive (of which I am doubtful), they are groundless, as every word contained in my address is to the disadvantage of our competitors.

Now why didn't they protest when Leeds gathered together all the most antiquated, defective, broken-down gas-consuming appliances they could lay hands on, and experimented with them to ascertain the worst possible method of consuming gas, and compiled the results, and read them in the form of a paper at an Institution meeting, thereby giving them wide publicity? Is Mr. Goodenough prepared to say that our competitors did not make use of the figures to our detriment? If he does, he is very simple-minded. He condemns my constructive proposals, but never a word did he utter against the destructive utterances of Leeds.

Now, Mr. Goodenough, come along with me to your Committee-room. You say that the lighting question has often been considered. What has evolved from your deliberations? Practically nothing. I know all about the difficulties you have to contend with on the lighting question, and that you must move cautiously; and you have my sincere sympathy in the matter. But difficulties can be surmounted, and without any injury to the Association. I discussed the matter with Mr. J. W. Auchterlonie, who is a member of the Executive; and I have no doubt he will lay my views before you.

As regards the architects, I am still of the same opinion. Where they are forced to instal gas they will do so, but not otherwise. The housing schemes mentioned are an example of what I mean. Neither are those so-called expensive conferences one atom of good, nor ever will be. Rather inaugurate some good public lectures.

Mr. Goodenough has missed the purport of my address—viz., to bring the gas industry to the front, and get it installed into its proper place—the first rank. For if ever this country has the misfortune to be forced into another war, it is the gas industry, and not the electric industry, that is going to be our salvation. At the present time, everybody, from the Government downwards, including the daily Press, are wiping their feet on us. Let us be up and doing, and let the country at large know of its danger. No one seems to have any idea of the way we in South Wales are misrepresented in the Press, and the daring liberties that at times are attempted with us.

I will relate one example. Some time ago we were invited to a conference by the steel manufacturers, who had the barefaced audacity to propose to us that we should commit industrial suicide, by asking us to circularize our consumers to virtually abandon, or at the very least diminish, the use of gas to the vanishing-point, to enable the steel industry to make vast profits. When asked if the electrical industry would be requested to do likewise, the reply was: "Oh, no; it would never do to interfere with it."

One thing I would ask them to do is to eliminate the name of the "B.C.G.A." from all advertisements. My reasons for this I will communicate to our representative. Another thing I would ask them to do is to show their belief in gas at No. 30, Grosvenor Gardens, more especially at the entrance. I certainly cannot say it is a credit to the "B.C.G.A." at present. Example is better than precept.

Finally—I append something which should open one's eyes.

JAMES ROBB.

Gas-Works, Chepstow, June 26, 1922.

ENCLOSURE.

Extract from "Municipal Engineering and the Sanitary Record"—June 22, 1922.

LIGHTING: PUBLIC AND PRIVATE.

BRITISH COMMERCIAL GAS ASSOCIATION: A CRITICISM.

Mr. James Robb, of the Chepstow gas undertaking, had something to say with regard to the British Commercial Gas Association at a meeting of the Wales and Monmouthshire District Institution of Gas Engineers and Managers, of which he is President. Mr. Robb expressed the view that sufficient attention has not been given to the advocacy of the lighting, as opposed to the heating and cooking side; and the former he describes as the most stable part of the gas business. Whether this be a fact or otherwise is not for us to express an opinion; but there can be no question that the advocates of electricity for lighting purposes are possessed of an amount of push and go which is not to be discovered in the gas industry generally. Descriptions of improvements in gas lighting apparatus are rarely to be found in the Press, for the simple reason that manufacturers, in their modesty, refrain from supplying them, even when invited to do so.

A QUESTION TO MAKERS OF LIGHTING APPARATUS.

Why is it that makers of public street lighting apparatus and fittings are so retiring where conferences and meetings of municipal engineers and surveyors are concerned? As an indication of this partiality for hiding their lights—and lighting apparatus—under bushels or other obscuring media, take the conference now proceeding at Cardiff. This important meeting is being attended by representatives of local authorities from all parts of the kingdom, and such representatives will include many public lighting engineers. But what is being shown for their edification? The programme contains the name of one firm only—the Horstmann Gear Company—who are concerned with the manufacture of automatic gas-control apparatus. Manufacturers of up-to-

date lamps, burners, mantles, fittings, and novel systems of lighting are not represented. And yet the opportunity is unique, and, from a business point of view, should prove of the utmost value. Why, then, this diffidence?

AMERICAN OPINION ON LONDON STREET LIGHTING.

The correspondent of a Chicago journal, who has been visiting London in search of information, refers to the lighting of some London streets in the following pungent terms: "London, intellectually, is bright and scintillating; but from a commonplace point of view it possesses deficiencies. Wandering into a metropolitan suburb—not a great distance from the 'hub'—I was astonished at the lack of attention paid to street lighting. It was so overpoweringly brilliant that actually I was unable to read the street name-plates, which, instead of being on the lamps, where the light *was*, were stuck up somewhere near the skyline, and miles beyond where light from the lamps or ordinary vision could prove of any use. In many cases the light from the street-lamps, instead of being concentrated upon roads and footways, was making futile attempts to illuminate the sky. Quite small towns in America have studied this subject and achieved results. Why does London hang behind?"

SIR,—In reference to the criticism by Mr. Robb of the "B.C.G.A." advertising, you may be interested to see the enclosed in "The Advertiser's Weekly" for Friday last.

F. W. GOODENOUGH.

No. 30, *Grosvenor Gardens, S.W.*,
June 26, 1922.

[ENCLOSURE.]

Extract from "The Advertiser's Weekly."—June 23, 1922.

A SLUR ON THE SOCIETY JOURNALS.

Criticizing the advertising policy of the British Commercial Gas Association at a recent conference of the Wales and Monmouthshire District Institution of Gas Engineers and Managers, the President (Mr. James Robb) is reported to have suggested that the "B.C.G.A." "should take into consideration the advisability of dispensing with whole-page advertisements costing from £300 to £800, and confine themselves to short paragraphs and advertisements in all newspapers over the entire country, and not give so much attention to the so-called society papers, which were only looked at by a few people who wished to see the latest fashions in hats and gowns." In making this statement, Mr. Robb, whether deliberately or unintentionally, is doing a grave injustice both to the society journals and their readers.

While Mr. Robb's remarks carried little weight with the "B.C.G.A." publicity experts, whose selection of advertising media is, of course, based upon long experience and practised judgment, they may possibly influence some who, like Mr. Robb himself, must be regarded as laymen as far as the technique of advertising is concerned; and consequently we take the earliest opportunity of dealing with them. Far from being read by "only a few people," the society journals, which occupy a high place in the long list of advertising media, have very substantial circulations, among a wealthy and cultured class. That they succeed in securing the lively interest of this class, is amply proved by the excellent results which they have always brought to those who make use of their advertisement columns. If Mr. Robb will examine a file of any of these journals, he will find that they contain a very considerable volume of advertising, and that the same advertisers are to be found in issue after issue. Would this be the case if their advertising was not productive of excellent results? Most certainly not.

The inclusion of these journals in the list of media employed by the "B.C.G.A." is based upon perfectly sound reasoning. The class they reach is one which devotes very considerable thought to all matters affecting the appearance, comfort, hygiene, and efficiency of its domestic appointments; and it can be reached in no more effective and economical way than through the advertisement columns of its own favourite journals.

Coke-Oven Gas Supply at Chesterfield.

SIR,—With reference to your paragraph in the issue of June 28—"Coke-Oven Gas Supply at Chesterfield"—the information contained therein is incorrect.

The Hasland Coking Company, which is attached to the Grassmoor Colliery, is the firm with whom the Corporation have been in negotiation for the supply of coke-oven gas. In the first place, the Company approached the Corporation with reference to the additional supplies.

The sliding-scale suggested was not 2d. per 1000 c.ft. for every 1s. rise or fall in the cost of gas coal, but one halfpenny. The former figure was obviously absurd, and was evidently incorrectly extracted from the records of the Council's business.

H. DAVIES.

Gas-Works, Chesterfield, July 1, 1922.

Some Gas Burners and a Moral.

SIR,—The members of the gas industry cannot but be grateful to Dr. Carpenter for his excellent paper on the above subject, given at the annual meeting of the Institution. My object in writing is to further express the hope that something may be done to stem the flood of cheap and shoddy gas burners and fittings (chiefly foreign) that are on the market, and do such disservice to the industry.

It seems to me that a system of standardization would be the best means of meeting the requirements of the industry; and I know of no better way at this juncture than by setting-up a small committee to deal with the subject, the machinery for which is readily available by the Council of the Institution nominating such from its members. Already the Institution has done the gas profession yeoman service in connection with the setting-up of Committees respecting standardization of meters and meter fittings and sale of coke, benzole, and products generally. If this standardization could be similarly tackled, it would be a great boon to consumers, as well as to the companies. Pipes, threads, and water-fittings have all been standardized, and threads made interchangeable, long since; and the Gas Light and Coke Company are even now seeking power in their Bill before Parliament to standardize service-pipes into consumers' premises.

I hold no brief for the "Metro" burner—it does not require one—but about twelve years since, by the courtesy of Dr. Carpenter, I was permitted to see this burner in the making, before it came upon the market; and though I noticed there were some 63 operations in the process, yet the finished article was so simple that, by slipping it on and off by bayonet-point attachments, it became in that respect a serious rival to the electric bulb. Quite apart from the question of fixed nipple or an air adjustment (which are beside the mark), and the difficulty of getting spare parts for the multitude of different makes of burners on the market, but more especially with a view to eliminating the shoddy article, I commend this question to the Institution. It concerns the distribution side of the industry very much; for every good burner put up is an advertisement, because as an illuminant gas is in the public eye. Gas in the early days came in as an illuminant, throve as an illuminant, and, according to the table shown by Dr. Carpenter, it is holding, and will continue to hold, its own as an illuminant (except in the heart of the Metropolis). As Mr. A. M. Paddon so aptly put it at the Juniors' meeting at Brighton, "It is of no use drawing a cheque on the works that one cannot cash on the district."

W. J. LIBERTY.

London, June 29, 1922.

Safeguarding of Industries.

SIR,—It will be a source of satisfaction, notwithstanding mischievous opposition dictated by the Executive of the National Gas Council, that the Committee appointed by the Board of Trade have decided that the case for a duty on illuminating glassware for use with artificial light has been made out. They state that "a sufficient body of reliable evidence has been produced to bear out the contention that German and Czecho-Slovakian glassware has, speaking generally, been sold or offered for sale at prices far below those at which it is possible to produce it with profit in England." There is no doubt that the evil of unemployment, which in most industrial centres is now painfully obvious, has been greatly aggravated by the inability of manufacturers to meet the competition of abnormally cheap German and Czecho-Slovakian imports, assisted by a depreciated German currency.

The Order imposes a duty of 33⅓ p.ct. *ad valorem*, and will continue until August, 1924. The interdependence of the gas industry on the prosperity and predominance of home industries is such that any course of action which would cripple certain important trades is to be deprecated; and for this reason I, along with many others, view with regret the opposition of the National Gas Council to reasonable protection against Teutonic invasion to rule once more our markets. For several years the gas industry energetically agitated—happily due recognition was at last accorded—to enable an economic price to be charged for their chief product, without involving ruin upon the industry. It would appear that having, by the Gas Regulation Act, 1920, secured from Parliament the right to this, a certain selfish section are unwilling for the same right to be granted, as it should be, to other industries carried on with reasonable efficiency and economy. Cheapness is not the only desideratum.

J. FERGUSON BELL.

Derby, July 1, 1922.

Regenerative Coal Gasification System, Ltd.—This is the title of a private Company registered, with a capital of £300 in £1 shares, to take over certain private rights from Mr. F. W. Clark and Dr. M. W. Travers, and to carry on the business of gas engineers, water-gas specialists, and manufacturers of plant. The registered office is at No. 196, Deansgate, Manchester.

Fixing the Basic Price.—The Town Clerk has reported to the Chester Corporation that the Chester Gas Bill, with the agreed amendments, had passed the House of Lords, and had been read the first time in the House of Commons; and that the Corporation's Parliamentary Agents had written drawing attention to the fact that the Unopposed Committee of the House of Commons had taken the view on another Bill that they were not in a position to fix the basic price. While accepting the principle, they had left it to the Board of Trade to fix the actual price; and it might be that the same course would be adopted in the case of the Chester Gas Bill. He (the Town Clerk) had written to the Parliamentary Agents suggesting if the same point should be raised, the Unopposed Committee should be informed that the basic price had been fixed between the City Council and the Company after most careful consideration, and on receiving expert advice; and the Committee should be urged to leave the Bill as so settled—the basic price being subject to revision by the terms of clause 8 thereof, at any time and from time to time after the year 1925, by Order made by the Board of Trade.

Benzol and Bye-Products Company, Ltd.—At the annual meeting of the Company last Wednesday, Sir Henry Bax-Ironside, who presided, said that the profit and loss account covered seven months to March 31, 1921. After deducting all other expenses, including depreciation, there was a profit of £39,903, which, with the balance of £17,532 brought forward, made a total of £57,435. A sum of £9719 had been applied to the payment of an interim dividend of 10 p.ct. to Aug. 31, 1920; £8000 was set aside as reserve for taxation; £4940 was written-off underwriting and over-riding commission, leaving a balance of £34,775 net profit. From this net profit there has been paid preference dividend to March 31, 1921, absorbing £14,943, and an ordinary dividend of 5 p.ct. to March 31, 1921, absorbing £12,631 (both amounts inclusive of tax), leaving a balance to carry forward of £7201. Had they not been the possessors of very efficient and capably conducted coke-ovens and bye-product works, their colliery would long since have had to follow the fate of others by being shut-down. As it was, their bye-product works had continued to earn large profits. The policy the Board had adopted was the conservation of their resources for the time being; and it was not deemed prudent to pay further dividends for the present. Deliveries are now satisfactorily proceeding under the fifteen years' contract for the supply of gas to the Corporation of Ossett.

REGISTER OF PATENTS.

Gas Turbines.—No. 179,829.

KLAUDER, W., junr., of Westhofen, Germany.

No. 13,938; May 18, 1921.

It has already become known to introduce in the working process of gas turbines cooling means to reduce the high temperature and the speed of the products of combustion. Superheated steam has already been used for this purpose, being either admitted to the turbine as an individual working medium alternating with the gases produced by combustion or admixed with the products of combustion. Over the alternating method the mixing of steam and gas to a homogeneous driving medium presents the advantage of uniform pressure and temperature.

This invention has for its object a combination of the above-mentioned working methods. Several explosion chambers intervening in the cycle of the working process are fed alternately and successively with gas and steam; these media being collected, before the work is actually done, in a large annular chamber connected to all the explosion chambers.

Means for Lifting Producer Doors.—No. 179,834.

SOUTH METROPOLITAN GAS COMPANY, of Old Kent Road, S.E. 15, and KINNER, H. G. H., of Deptford, S.E. 8.

No. 14,805; May 27, 1921.

This invention relates to a device for lifting heavy doors, such as are used in retort houses for the producers. A bracket is pivotally mounted upon a stoking machine, preferably a pusher, and to the bracket is pivoted an arm, one end of which is provided with a handle while the other end is adapted to enter a hole in the lug on the cover of a producer.

In practice the stoking machine is moved so that the arm is opposite one of the producer lids. The forward end of the arm is then lowered to engage the lug. The arm is then pulled down and at the same time moved backwards, so that the door is raised and moved away from the retort. A catch may be provided for retaining the arm in this position.

Furnaces.—No. 179,965.

SEARS, S. A., of Levenshulme, and TWIGG, W. R., of Luton.

No. 31,942; Nov. 11, 1920.

This invention refers to improvements in furnaces, and has for its object to provide, in combination with a furnace using producer gas or the like, a preheating chamber which can be used either as a regenerator or a recuperator.

In one very convenient manner of carrying the invention into effect, the chamber, which is preferably in duplicate below the furnace, is arranged with a system of flat tiles (main tiles) which are placed either horizontally, vertically, or at any other convenient angle; each of the tiles having apertures along two parallel sides, the apertures being connected along one side to the tile above or next adjacent to it in one direction, and on the other side to the tile below or next adjacent to it in the other direction by means of tubes or conduits. These latter are formed, with a spigot and shoulder, and each tube is hermetically connected by means of fireclay or other suitable refractory cement.

In connection with five sheets of detail drawings, the complete specification describes: (1) A double-chamber regenerative furnace; (2) a double-chamber recuperative furnace, both gas and air being preheated; (3) a furnace for joint working; (4) a single-chamber air recuperating furnace; and (5) a single-chamber joint regenerative and recuperative furnace, the air only being preheated.

In all the constructions illustrated it is assumed that the air is supplied to the furnace under pressure. In some cases, however, a chimney or other suitable means for producing a natural or forced draught may be employed; also, town gas or oil may be used as fuel if desired.

The whole of the tiles, bricks, and tubes above-mentioned are to be made of refractory material, preferably of high conductivity and suitable strength. Where joints occur in the tiles, suitable means will be provided for breaking the joints by means of rebates, spigots, or the like.

In all the modifications of furnace described the construction is such that with appropriate air, gas, and flue connections the chamber or chambers can be used as a regenerator, or recuperator, or both at the same time.

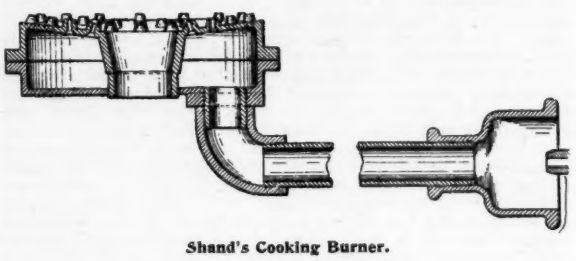
Gas Burners for Heating, Cooking, &c. No. 180,003.

SHAND, W. L. and A. McD., both of Caulfield, near Melbourne (Vic.).

No. 4725; Feb. 10, 1921.

This invention relates to gas burners for heating and cooking purposes wherein the burner consists of two superposed chambers forming the mixing chamber for the gas and air. In burners of this type it has been suggested previously to construct the upper perforated portion of the burner of convex shape, the upper surface of the burner being provided with concentric rows of holes, the inner row of holes being generally directed inwards. It has also been suggested to provide burners of the type above referred to with a central passage for the supply of additional air.

According to this invention the upper surface of the burner is concave and is provided with projecting nipples, the arrangement being such that any liquid falling upon the upper surface of the burner gravitates towards the centre thereof, where it escapes through a central passageway, while the projecting nipples minimize the danger of foreign substances entering and blocking the passages. The nipples are arranged in concentric rows, the inner row being inwardly directed,



Shand's Cooking Burner.

so that the air and gas mixture issuing therefrom will be directed towards the centre of the burner.

The illustration is a longitudinal section of the burner.

Distillation of Liquids.—No. 180,347.

WILSON, J. L., of Bury.

No. 32,391; Nov. 17, 1920.

This invention relates to the distillation of liquids, such as tar and oils, by the continuous process, and has for its main object to obtain a graduated series of products without recourse to fractional distillation as practised at present; to enable one still to do the work of several; to combine the still and preheater in such a way as to minimize loss of heat by radiation and conduction; and generally to consolidate the whole plant and lessen the cost of construction.

Inert gases are employed, which have been passed through a series of condensers in which the fractional condensation is effected, and through all of which the tar has been passed in order to preheat it. The vessels used for preheating, for distilling, and for cooling the residue are so arranged as to have the direct heat applied as centrally as possible, the still being to some extent insulated by the arrangement relatively thereto of the preheater and pitch cooler.

Fig. 1 is a plan view of a plant by means of which fractional condensation can be effected according to the invention; and fig. 2 is a sectional elevation on the line 2—2 of fig. 1.

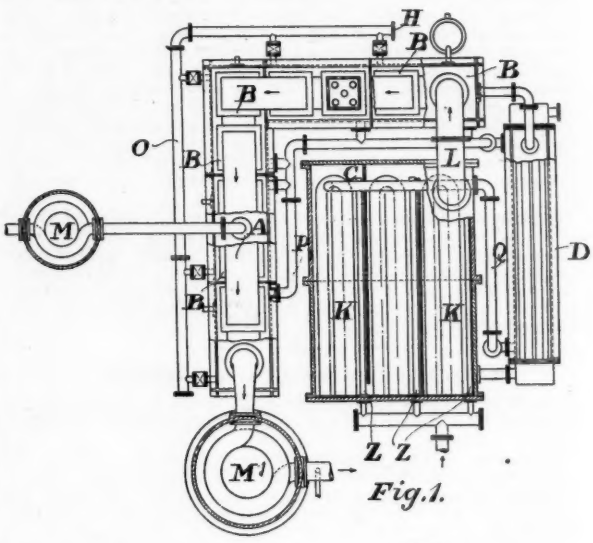
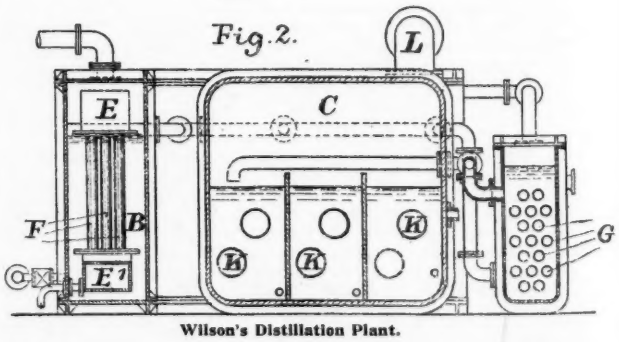


Fig. 1.

Fig. 2.



Wilson's Distillation Plant.

Referring to the drawings, A indicates the preheater, which comprises a number of condensers B connected in series, C the still, and D the pitch cooler. Each of the condensers B comprises two superimposed chambers E E¹ connected by a number of vertical tubes F; and the pitch cooler D is of somewhat similar form to the condensers, comprising a series of horizontal tubes G through which the pitch

passes to be cooled by the surrounding tar. The still C is provided with baffle plates at right angles to the front plate, and each compartment thus formed contains a hairpin heating tube K, the upper and lower limbs of which are set in an oblique plane (as shown in fig. 2) to facilitate cleaning. The still head, which is in fluid connection with the first condenser, is designated by the letter L, and M M^1 indicate the water condensers; the distillate from the preheater passing through the head A^1, which is preferably baffled, to the condenser M, and the condenser M^1 being utilized to condense vapours from the still which are uncondensed by the condensers B. It will be observed that the preheater A and pitch cooler D are so disposed as to surround the two sides and back of the still C, leaving the front plate open, and that the still C is separated from the surrounding compartments by an air space.

In the process of distillation, tar enters the pipe O at the point H and passes simultaneously in desired proportions to all the condensers B through the tar inlets. From the condensers it passes through outlets to the pipe P, where the various flows are united and led to the pitch cooler D. Thence it passes through the pipe Q to the still C; and pitch leaving the still and passing through pipes G in the pitch cooler to storage is cooled by the surrounding tar in the casing D. Inert gases or steam are blown into the still C through perforated pipes Z to carry off the vapours.

The vapours produced by the distillation, accompanied by gases or steam as desired, pass out of the still C by the still head L, which is preferably baffled to prevent mechanical carrying-over of drops from the tar. Entering the preheater A, they are cooled by the ingoing tar. The condensation is effected by passing the vapours through successive sets of tubes F; each set being placed in a separate section of the preheater so as to be influenced only by the desired quantity of tar used as cooling medium. The area of the cooling surfaces, and the temperature and quantity of the cooling medium will control the amount of condensation in any one section and therefore the quality of condensate flowing away.

Discharging Retorts.—No. 180,856.

JOHNSON, J. Y., of Lincoln's Inn Fields. A communication from "Entreprises et Matériel," of Brussels.

No. 11,454; April 20, 1921.

The specification of patent No. 14,089 dated June 24, 1903, granted to Joseph de Brouwer, describes an apparatus for discharging gas retorts. The object of this invention is to effect improvements in such apparatus.

Figs. 1 and 2 are, respectively, a longitudinal section and a plan showing the essential members (with parts cut away) of a jointed rack for a coke pusher in accordance with the invention. It will be seen that the straight member, previously made in one piece, comprises two parts A and B. At the end next the mouth of the retort, the part A carries the buckler, or pushing-plate, C, as in the known apparatus. The other part, or intermediate member, B, is connected at the opposite end with the first link of the jointed rack.

The head-plate E, which projects from the front of the buckler, or push-plate, C, and facilitates the discharge of the retorts, is liable to very rapid wear, which puts the plate out of service after a short time. In order to obviate this drawback, and at the same time to secure the head-plate very securely in position, the head-plate is composed of a fitted-on piece attached to the bottom member of the push-plate by bolts F, supplemented by bolts G, passed through upwardly-extending lugs on the head-plate, and into the lower part of the buckler, or push-plate.

The putting together of the head-member A and the intermediate member B should also be effected in the firmest manner possible, in order to prevent any shifting, since these two members should remain in alignment throughout. With this object they are connected by means of a kind of brace, or key, H, secured to each of the members by rivets or bolts J.

According to patent No. 14,089 the links are connected together, and in relation to the straight member, by joints consisting of a fork and a male end traversed by a pin. This system has the serious defect that the whole of the lateral thrust is transmitted to the eyes of the fork, which soon open and set-up transverse play enabling the jointed rack to assume a zig-zag position in the retort. In consequence, the connected parts very soon become unfit for use, although far from being completely worn out. According to this invention, the jointing fork is dispensed with, and the parts are connected by means of a member L forming a kind of brace, or recessed key. This is interposed between the cheeks of the links D and the cheeks of the intermediate member B, and terminates at each end in eyes through which and corresponding holes in the cheeks pass the joint pins.

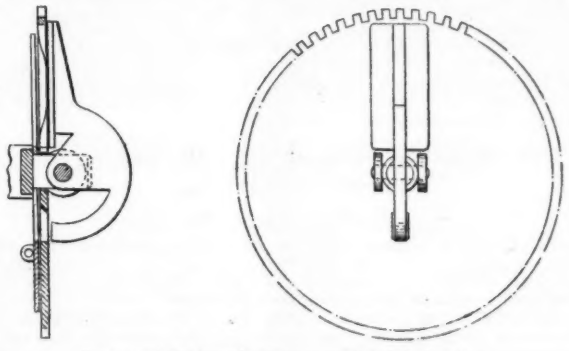
Prepayment Mechanism.—No. 180,406.

FOX, T., of Sefton Park, and ROBINSON, S., of West Derby.

No. 5426; Feb. 17, 1921.

This invention relates to improvements in gas-meters provided with a prepayment device, and more particularly to that type of device which includes a price-changing disc. It has been customary to provide a guard disc to cover the coin slot in the price-changing disc when the coin pocket is not in a position coincident therewith. Further, in this type of device a handle is provided which is adapted to be rotated to cause the rotation of the spindle that carries the guard disc and coin pocket, and thereby to effect the rotation of the quantity wheel on the insertion of the coin.

The object of the present invention is to ensure that tampering with the mechanism with the object of fraud is impossible at the moment when the coin slots in the price-changing disc and the guard disc coincide and the handle is at its zero position. A guard plate and locking member are formed integral with the handle, which is mounted to



Fox's and Robinson's Prepayment Safety Device.

pivot in a plane at right angles to the face of the price-changing disc, so that at the moment when the coin slots coincide the slots are either covered by the guard plate or the spindle is locked against rotation by the locking member.

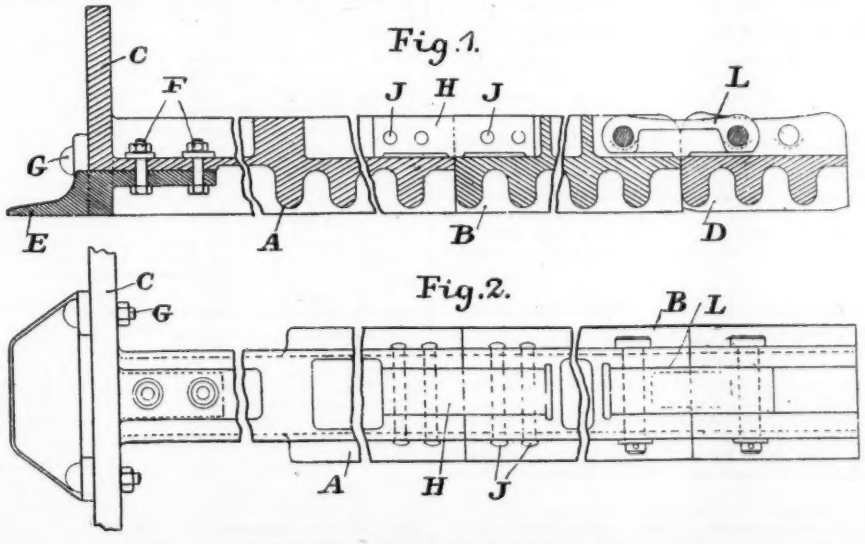
The construction is clear from the illustrations—a front and a side elevation of the device.

Lighting and Extinction of Burners.—No. 180,547.

COMPAGNIE POUR LA FABRICATION DES COMPTEURS ET MATÉRIEL D'USINES À GAZ, and MILLET, L. C., both of Paris.

No. 13,403; May 11, 1921.

This invention relates to apparatus adapted to perform automatically the lighting and extinction of gas burners at times which can be predetermined at will, and particularly to apparatus in which these operations are performed by means of two engaging sectors actuated by a clockwork adapted to operate the mechanism at predetermined times. It has for its object an improved apparatus in which the operations of lighting and extinction are caused to take place suddenly.



Modified Construction of De Brouwer Pusher.

The apparatus, which must be connected to the gas supply pipe between the burner and the mains, comprises two essential parts:

(1) A distributing device, opening or closing the inlet apertures admitting gas to the burner and to the pilot burner.

(2) A mechanical arrangement operating the distributing device at predetermined times in such a manner that the lighting and extinction takes place instantaneously at predetermined times, first by the admission of gas to the burner, the gas inlet to the pilot burner remaining open, then by the closure of this gas inlet until the following extinction, the gas inlet to the burner remaining open. The extinction is produced by the closure of the gas inlet to the burner while the gas inlet to the pilot burner remains open, the latter inlet remaining open until the next lighting operation. The arrangement comprises a reciprocating or rocking device adapted instantaneously to close and open alternately the inlets to the main and pilot burners respectively, a clockwork for operating the device, two geared discs, and means for causing certain phases in the operation of the discs to take place suddenly, such means consisting in a suitable combination of springs.

The specification and the drawings are in close detail, and pressure on this register precludes their reproduction at length.

Gas-Tap Safety Catch.—No. 180,411.

TURNER, F., of Birmingham.

No. 5588; Feb. 18, 1921.

This invention relates to improvements in gas and other taps, cocks, or the like, and refers particularly to gas and other taps of the type in which a spring controlled catch is provided to retain the tap in the open or closed position to prevent or lessen the possibility of accidental or irresponsible interference with the setting of the tap. The invention essentially comprises an improved safety device in which a member of sheet metal or the like secured upon the body of the tap and at one side thereof carries a resilient curved tongue which projects outwardly into the path of the thumb-piece or handle by which the tap is operated, the tongue preventing rotation of the thumb-piece or handle until pushed aside out of its path.

Grids for Purifiers, &c.—No. 180,734.

SADLER, H. S., of Frome.

No. 6133; Feb. 23, 1921.

This invention relates to grids for gas purifiers, scrubbers, and the like. Hitherto many different forms of grid have been proposed, generally of wood or wooden bars; and it has been found in practice that the life of such grids is comparatively short.

The object of the present invention is to provide improved grids of reinforced concrete; and the specification describes and illustrates several forms of such, and details of their construction.

Protecting Mantles.—No. 180,827.

CARPENTER, C., and STOKES, A., both of Old Kent Road, S.E. 15.

No. 9936; April 4, 1921.

This invention relates to means for protecting incandescent gas-mantles, and is especially applicable for use with the inverted type.

The mantle is protected by means of a sleeve or cylinder surrounding it, which preferably is formed of non-flammable material, such as asbestos, thin metal, or material treated to render it non-flammable. The mantle ring carrying the impregnated fabric is attached to the cylinder in such a manner that on incinerating the mantle the protector surrounding it readily falls away, leaving the burnt-off mantle suspended from the burner nozzle. By this means damage to the fabric by contact with the fingers is avoided. The non-flammable protector, in addition to this special function, may also form the containing storage box.

In one way of carrying out the invention, the cylinder is attached to the fireclay mantle ring by means of a diaphragm of inflammable material, such as tissue paper. When the mantle is burnt-off, the diaphragm is burnt away and the cylinder drops clear of the mantle, which is left suspended from the burner nozzle.

Atmospheric Burners.—No. 180,829.

GLOVER, W. R., of Gothic Works, Edmonton, and SMITH, J. H., of Birmingham.

No. 10,035; April 5, 1921.

This invention relates to that class of atmospheric gas-burner in which the air inlet holes to an auxiliary air chamber surrounding the mixing chamber are positioned on a flat portion carrying a flat holed plate usually revolved direct by hand to control the admission of air to the auxiliary chamber. The object is to provide the holed plate with teeth, so that it can be revolved by a pinion on a stem carrying a button positioned outside the auxiliary chamber, and other particulars of construction of the burner parts.

Automatic Charging of Skips.—No. 180,919.

WEST, J., of Southport, and WEST'S GAS IMPROVEMENT CO., LTD., of Manchester.

No. 17,329; June 24, 1921.

This invention relates to the automatic charging of telpher or crane skips with measured quantities of material, such as, for example, in the discharge of coke from a bunker or hopper in a gas-works. The object of the invention is to provide simple and reliable apparatus for the purpose.

In one convenient application, the hopper is fitted at its base with a radial or hinged door, or its equivalent, through which, when open, the coke descends into a measuring chamber of such capacity as will hold sufficient coke to fill a skip of a telpher, crane, or other machine. The measuring chamber is also fitted with a radially mounted discharge door, and with such door there is arranged a spout or shoot to direct the outgoing coke towards the centre of the skip to ensure that the latter shall be properly charged; the shoot being brought in and out of its service position by the respective opening and closing movements of the door.

The doors of the bunker and of the measuring chamber are connected by linked arms or levers. For the operation of the doors there is arranged with the linked arms a rocking lever having at one end a balance weight, while its opposite end projects to a convenient position for engagement by the skip. When the empty skip is brought to the charging position, its weight depresses the adjacent end of the rocking lever and raises the balance weight at the opposite end; such movement of the lever effecting first the closing of the door of the hopper and subsequently the opening of the door of the measuring chamber to permit the contents of the latter to gravitate down the shoot into the skip. When the loaded skip is raised or moved away from the charging position, the balance weight of the rocking lever descends and thereby effects first the closing of the door of the measuring chamber and the withdrawal of the shoot, and subsequently the opening of the door or outlet of the hopper to permit of the refilling of the measuring chamber.

The length of travel and the timing of the respective movements are regulated to ensure the filling of the measuring chamber from the hopper and the complete discharge of the measured quantity to the skip. Suitable guides may be employed to retain the skip in the correct position relative to the discharge shoot moving in association with the door of the measuring chamber.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Neath Corporation Bill: Read a second time, and committed.

Windsor Gas Bill: Read a second time, and committed.

HOUSE OF COMMONS.

Progress of Bills.

Chester Gas Bill: Read a second time, and committed.

Croydon Gas Bill: Reported, with amendments.

Doncaster Corporation Bill: Reported, with amendments, from the Local Legislation Committee.

Stretford and District Gas Board Bill: As amended, considered; and to be read the third time.

Imported Gas-Mantles and Taxation.

Mr. FOOT asked the President of the Board of Trade if he could give the date when the Referee announced his decision that a duty of 33⅓ p.c. was payable on certain materials used in the manufacture of gas-mantles, and the date when this decision was put into force; and, in view of the uncertainty and chaos existing in the trade, could he make an immediate announcement as to what is the actual duty payable on each gas-mantle.

Mr. BALDWIN replied that the decision of the Referee was signed on May 22, and became operative as from May 25. The assessment of duty was a matter for the Commissioners of Customs, who he understood expected to issue in the course of the next few days instructions as to the valuations to be taken for the purpose of assessing duty.

Mr. FOOT, in a further question, asked the Chancellor of the Exchequer if he was aware of the chaos now existing in the gas-mantle industry by the uncertainty prevailing as to what tax was payable. Seeing that the taxable material was assumed to be about 5 p.ct. of the value of the mantle, could he say why he was demanding that 25 p.ct. should be deposited; and if he was not yet in a position to announce what the duty was to be, would he reduce this percentage of 25 p.ct. immediately.

Sir J. BAIRD, who replied, said he thought the hon. member was under a misapprehension. The Chancellor of the Exchequer had already stated in reply to a question that the 25 p.ct. referred not to the duty, but to the value on which the duty was calculated. The deposit of duty was therefore at the rate of only one-eighty-third p.ct. of the value of the mantle, and the Chancellor of the Exchequer did not see his way to reduce this amount further pending the determination of the exact rates appropriate to the various types of mantle, which was expected within the next few days.

Mr. KILEY asked the Chancellor of the Exchequer if he was in a position to say what was the amount of duty the Board of Customs had decided to impose on imported gas-mantles; and would he state whether delivery of gas-mantles was being allowed on a deposit of 25 p.ct. of the value of the complete mantles?

Sir J. BAIRD replied that the amount of duty payable in respect of imported gas-mantles would vary according to the value of the dutiable ingredients. But as regards 90 p.ct. of the importations, it was estimated that the duty involved would not exceed 5 p.ct. of the value of the complete article. With regard to the last part of the question, the Chancellor of the Exchequer had already pointed out that delivery had hitherto been allowed on deposit of a sum equivalent to the duty on a value of 25 p.ct. of the value of the complete mantle, not on a deposit of 25 p.ct. of the value of the mantle.

German Witnesses at the Gas-Mantle Inquiry.

Sir J. NORTON-GRIFFITHS asked the President of the Board of Trade whether he could give the names of any German manufacturers of gas-mantles, or representatives of the same, who had been permitted to tender evidence or to make statements at the hearing of the British

gas-mantle manufacturers' application, under Part II. of the Safeguarding of Industries Act; and whether any facilities for their attendance at the hearing of such application had been afforded to them by the Board of Trade.

Mr. BALDWIN said he had been informed that the Committee, at the suggestion of the interests opposing the application referred to, decided to hear evidence from Herr Heinrich Ziegler, one of the Managing-Directors of the Auerlicht Gesellschaft of Berlin, and from Herr Bernhard Young, Manager of the mantle factory of that Company. No special facilities were granted for the attendance of these persons; but the Board of Trade suggested to the Home Office that, in the event of there being no objection to the witnesses in question being admitted to this country, it would be convenient if the necessary permits could be issued without delay.

Safeguarding of Industries Act, 1921.

Copies have been presented to the House of Commons of Reports by Committees appointed by the Board of Trade to inquire into complaints under Part II. of the Act in respect of, among others, illuminating glassware.

Gas-Works Effluent and River Pollution.

Mr. BRIGGS asked the Minister of Agriculture if he was aware that, as a consequence of the discharge of a tar-like effluent from the gas-works above Holme Bridge, Bakewell, Derbyshire, a large number of fish in the River Wye had been killed; and would he use his powers to prevent any recurrence of such discharge of poisonous effluent from this or any other source along the banks of the Wye.

Major BARNSTON who replied, said his right hon. friend was aware of the occurrence referred to, and understood that legal proceedings were pending. He had no powers to prevent the pollution of rivers; but it was hoped that, by means of the Salmon and Freshwater Fisheries Bill, now under consideration in another place, more adequate powers might be conferred upon Boards of Conservators for preventing the pollution of rivers in their districts.

Buckhaven and Leven Gas Commission Order Confirmation Bill.

On consideration of this Bill, in the House of Commons on Tuesday of last week, Mr. Munro moved, and it was adopted, the following clause for the protection of the County Council of Fife and the Kirkcaldy District Committee:

(1) All mains, pipes, and works to be laid by the Joint Gas Commissioners in or along any highway, road, street, or bridge repairable by the county authorities shall be laid with all reasonable dispatch. The Joint Gas Commissioners shall with all reasonable dispatch complete their operations and restore the highway, road, or bridge to the reasonable satisfaction of the road surveyor of the county authorities;

(2) Any question which may arise between the Joint Gas Commissioners and the county authorities or the road surveyor under this section shall be referred to and determined by an arbiter to be nominated, failing agreement between the parties, by the Sheriff of Fife and Kinross on the application of the Joint Gas Commissioners or the county authorities, and the decision of such arbiter shall be final.

The Bill was read the third time on Wednesday, and passed. In the House of Lords it has been read the first time, and deemed to have been read a second time and reported from the Committee.

CROYDON GAS BILL.

This Bill (see "JOURNAL" for March 1, p. 515) came before the Unopposed Committee of the House of Commons, presided over by Mr. JAMES D. HOPE (Chairman of Ways and Means) last Wednesday.

Dr. C. F. T. BLYTH, LL.D. (Messrs. Blyth, Dutton, Hartley, and Blyth, Parliamentary Agents) briefly outlined the proposals in the Bill, which were to convert and simplify the existing capital—there are now five different classes of ordinary stock—and to give power for the raising of additional capital.

At this point the Chairman remarked that he was a debenture holder in the Company, and should, therefore, withdraw from the Committee. On the other hand, if he withdrew, there were not sufficient members of the Committee present to form a quorum. Dr. Blyth said, however, that the Bill did not touch the present debentures; and, after further discussion, the Chairman decided to remain, but pointed out that it was only right he should mention the matter.

Dr. BLYTH, continuing, said the reason for the conversion was that the Company could not get the conditions they should get in raising new capital. He had figures comparing the Croydon Company with other companies round London, which were in exactly similar conditions. One of the Croydon Company's stocks stood at a price which gave a yield of £7 6s. p.ct.; whereas in the case of the other four companies he had dealt with for comparison, the prices stood at figures which yielded from £5 6s. up to £6 7s. He then detailed the proposals with regard to conversion (as already given in the "JOURNAL"), the ultimate result of which would be that there would be two stocks instead of five—one a sliding-scale stock with a 3½ p.ct. standard dividend, and one a maximum dividend stock of 5 p.ct. In reply to the Chairman, he said there was preference stock, in front of these two stocks, which would not be affected.

Sir ERNEST MOON (a member of the Committee) asked which was the larger stock of the two.

Dr. BLYTH said the sliding-scale stock was the larger. The total sliding-scale stock would amount to £660,000, whereas the maximum dividend stock would be about £80,000, together with some £200,000 of the existing "D" stock, which was also to be called maximum dividend stock. Thus, in the result, the sliding-scale stock would be about double the amount of the maximum dividend stock.

Replying to the CHAIRMAN, who asked how the conversion would help the Company in raising new capital, Dr. Blyth said that it was the desire to reduce the present complexities, which mystified the investor, and put him off giving the best price.

Dr. BLYTH, continuing, said that the Bill proposed to raise £200,000 additional capital, and there were the usual one-third borrowing powers. There had been no material alterations since the Bill left the other House.

At the request of Sir Ernest Moon, Dr. BLYTH briefly explained Clause 29 of the Bill, which is the clause recently included in the Model Bill, to the effect that a valve is to be provided where high-pressure air is used.

In answer to the CHAIRMAN, who asked whether this clause had been put before the Corporation, Dr. Blyth said it had, and the Corporation had agreed.

The CHAIRMAN asked whether the Corporation had taken technical advice, from the point of view of the consumer.

Dr. BLYTH said he did not know; but the matter had been very fully considered by a conference of the Town Clerk and the authorities concerned. Finally, he pointed out that a clause had been inserted providing that the meetings of the Company shall be held annually instead of half-yearly.

Mr. W. W. TOPLEY (Secretary of the Croydon Gas Company) proved the preamble of the Bill, which was ordered to be reported for third reading.

WORTHING CORPORATION BILL.

This Bill was ordered to be reported for third reading by the Unopposed Committee of the House of Lords on Thursday, the 22nd ult. There are no gas provisions in the Bill; but it will be remembered that when it was before the Local Legislation Committee of the House of Commons, the Worthing Gas Company unsuccessfully objected to a provision to extend the area of supply of the electricity undertaking of the Worthing Corporation, on the grounds that they were large ratepayers; that the new area would prove unremunerative; and that any deficiency would fall upon the rates. (See the "JOURNAL," April 12, p. 104.) The Gas Company did not petition in the second House.

SOUTH WALES ELECTRICAL POWER DISTRIBUTION COMPANY BILL.

Objection to *Locus Standi* of Gas Companies.

The Court of Referees of the House of Commons, presided over by Mr. James D. Hope, considered an objection to *locus standi*, on Thursday, June 22. The petitioners are the Aberdare and Aberaman Consumers' Gas Company, and others, and they object to a clause whereby it is provided that local authorities authorized to supply energy within the area of supply of the South Wales Electrical Power Distribution Company may enter into agreements for a supply, and may subscribe to the capital of the Company. In the House of Lords the Gas Companies petitioned (see "JOURNAL," March 29, p. 768). The promoters objected to the *locus* of the Gas Companies, on the ground that they were in the same position as the ratepayers, who had no *locus*.

The *locus* was allowed.

European Gas Company, Ltd.

The Directors will report at the meeting of shareholders next Tuesday, that the profits of the year ended March 31, including receipts representing partial compensation for losses in previous years, have been sufficient to liquidate the balance at the debit of profit and loss on March 31, 1921, and to allow of the payment of a dividend at the rate of 5 p.ct., free of tax, for the year. An interim dividend of 2½ p.ct. was paid on Feb. 1 last; and the Directors accordingly now recommend the payment of a final dividend at the same rate—the balance being carried to general revenue. In spite of continued trade depression, the consumption of gas shows an increase at the rate of 4·43 p.ct., as compared with the previous year. The number of consumers has increased from 119,575 to 121,577, or at the rate of 1·67 p.ct. The negotiations with the Municipal Authorities with a view to settling bases for the calculation of the future price of gas, and establishing the compensation due to the Company on account of past losses, have been brought to a satisfactory conclusion at Amiens, Boulogne, and Caen. The Company's concession at Caen has been extended by five years, until 1946. The average length of all the concessions at March 31 last was 24 years. The works and plant at the stations were maintained in a state of efficiency; and a commencement has been made with various overdue replacements. In view of the approaching expiration of the Company's lease of the present London offices, and of the high rents ruling in the City of London, the freehold of Montague House, Devonshire Square, E.C., has been purchased; and the offices will shortly be transferred to that address.

New Gas Plant at Wallasey.—The construction of Wallasey's new gas plant is now nearing completion. Alderman Evans (the Chairman of the Gas Committee) has taken a very active part in pushing on the extensions, which were urgently required to meet growing demands. The scheme, which was commenced two years ago, and is costing £165,000, includes a new retort-house and coal and coke handling plant. The retort-house contains a bench of six settings, each of four vertical retorts, and has a rated capacity of 1,500,000 c.ft. per day; being capable of dealing with 120 tons of coal in this period. It is equipped throughout with modern labour-saving devices, and is designed to produce the most economical and efficient results possible. At present the gas produced is being washed and purified in existing plant; but the Committee hope to have the new work completed before the end of the year, when the whole unit will be entirely self-contained. Provision has been made for eventual duplication of all items when required, and the scheme will also embrace a system of high-pressure gas-mains to increase the pressure at various points in the district.

LEGAL INTELLIGENCE.

PREPAYMENT CONSUMERS AND A PRICE INCREASE.

His Honour Judge W. Moore Cann gave judgment at the Redhill County Court on Wednesday last in an action in which the Reigate Gas Company sued a slot-meter customer for 16s. 7d., which had been charged for an increase in the price of gas. There were seven other defendants, and between 300 and 400 consumers were concerned.

Mr. Horace Douglas, who appeared for the Gas Company, said that in April, 1921, there was a coal strike. The stocks of coal accumulated became exhausted. and it was necessary to purchase foreign coal which cost considerably more than the ordinary coal. The supply of gas consequently cost the Company more, and the cost was also increased by reason of the additional labour that was required. The question which His Honour had to decide was whether, on the contract entered into between the consumers and the Company, the plaintiffs were entitled to increase the price of gas.

His Honour, having perused a number of circulars sent out by the Company to their customers, asked after the Company had supplied gas on the slot-meter system could they say at the end of the quarter that the consumers would have to pay more. As he understood the position, it was that at the end of the quarter the Company said to their customers they must pay more for the past quarter, although they had put in their money in advance and had had the gas according to the value of the coin put in.

Mr. *F. S. Smith*, Engineer to the Company, said in April, 1921, the price to the ordinary consumer was 6s. 4d. per 1000 c.ft., and therefore adding 10d. for the use of cooking stove, meter, and fittings, the price to slot-meter holders was 7s. 2d. For 1d. the slot-meter consumer obtained 11·62 c.ft. of gas. To overcome the fractions, a cash adjustment was made one way or another, as registered by the meter dials. An additional charge of 3s. per 1000 c.ft. for the September quarter was based on the extra costs. It was made payable 1s. 6d. on the June quarter and 1s. 6d. for the September quarter.

Mr. Douglas said it was quite clear that the extra charges could not be fixed until the figures were worked out; and he contended that plaintiffs were entitled to 16s. 7d., which was the extra price for the September quarter.

Mr. A. H. M. Wedderburn, who appeared for the defendant, contended it all was a question of the construction of the agreement. He submitted that the words "current rate" meant the current rate at the time the agreement was signed. The contract went on to state that the payment was to be made "by depositing money in the meter provided by the Company." If the Company desired to increase their prices, they should have cancelled the agreement and made another.

His Honour said the Company had not the advantage of being within the operation of the Gas-Works Clauses Act; and, that being so, were more or less at large in fixing the price of gas. The Company said under their agreement they were entitled to fix the sum at 3s. additional to the price which ruled before the September quarter commenced, and that they were entitled to fix it in this way—1s. 6d. representing the June quarter, and 1s. 6d. representing the addition for the September quarter. There was an agreement to pay for the gas consumed at the current rate. The current rate was the rate properly chargeable for gas while the agreement was running, or during the currency of the agreement; and that varied from time to time. So that disposed of the legal argument of Mr. Wedderburn that there must be a fresh agreement whenever the price of gas was altered. This was an agreement for a sliding-scale of payment. What he had to consider was what was the agreement? It was an agreement to pay at the current rate. What was the current rate during the September quarter? It was perfectly clear that the current rate for the June quarter was 7s. 2d. per 1000 c.ft., and that the current rate for the September quarter was 7s. 2d., *plus* 1s. 6d. per 1000 c.ft., not *plus* 3s.; and this was perfectly clear from the circulars. Having come to this conclusion, he was of the opinion that the proper amount to be recovered was 7s. 2d., *plus* 1s. 6d., per 1000 c.ft., for the amount of gas consumed for the September quarter.

Mr. Douglas: What about the other 1s. 6d. for the June quarter?

His Honour said Counsel had not asked for that, and he had not decided the question except that, in his opinion, Counsel was wrong, although he (the Judge) had not heard the arguments.

Mr. Wedderburn said he had worked out the figures, and the amount under the judgment was 8s. 11d. against the defendant.

Mr. Douglas said they would accept that calculation.

In view of the possibility of an appeal, the Judge adjourned the other cases *sine die*, with liberty to restore to the list.

ALLEGED RIVER POLLUTION FROM GAS-WORKS.

An important case affecting gas undertakings came before the Bakewell (Derbyshire) Magistrates on Friday, when the Bakewell Urban Council were summoned at the instance of Harry B. Eaton, an Inspector of the Trent Fishery Board, Nottingham, for permitting liquid to flow into the River Wye at Bakewell so as to kill fish, and also with causing liquid to flow into the river.

Sir Norris Foster (Barrister, of Birmingham) presented the case for the prosecution. He said that about 30 dead trout were found poisoned in the River Wye near the Bakewell Gas-Works, and that this was due to tarry effluent from the premises flowing into the stream. He pointed out that the Wye was a tributary of the River Trent, at Nottingham, which contained salmon.

Mr. V. R. Cockerton, who defended, said this was a serious matter for Bakewell, and it would also be a very expensive business, as proceedings were being taken in the High Court. He alleged that the prosecution had really been instigated by the Marquis of Granby, through his Agent (Mr. Alex Carrington, of Bakewell).

Mr. *Edward Lascelles Hoyle*, of Holme Hall, Bakewell, stated that on going to fish in the Wye he found a number of trout poisoned near the Bakewell Gas-Works.

Mr. *Alex Carrington* said he took samples of water, and sent it to Nottingham for analysis.

Replying to Mr. Cockerton, witness said he was aware that the gas-works at Bakewell had been owned by the town for seventy years, and this was the first complaint that had been made about fish being poisoned in the river by tar effluent.

Mr. *Wilfred Rushton*, biologist, of London, considered the effluent from the gas-works had poisoned the fish.

Mr. Cockerton said the whole question was one of private rights and the seven miles of river fishing which belonged to Lord Granby. He contended that the fish had been poisoned by rain water coming from a newly-tarred road situated near the gas-works, and belonging to the Derbyshire County Council.

The first summons for permitting was dismissed; but on the second summons, the Urban Council were fined £5 and 15 guineas costs.

Alleged Theft of Gas.

At the Oldbury Police Court on Tuesday of last week, Joseph Chamberlain was charged with stealing 3024 c.ft. of gas, value 18s., the property of the Oldbury Gas Committee. Defendant did not appear; and Mr. Dawes, who prosecuted on behalf of the District Council, said the alleged offence was committed by the defendant putting metal discs instead of coins into the gas-meter at his home. As the defendant was not present, however, he would have to apply for an adjournment; but as the charge was one which was likely to prove serious, he asked the Bench to permit a warrant for the defendant's arrest to be taken out if he failed to appear. The Bench agreed to this course; and the case was adjourned for fourteen days.

A Scottish Gas-Works and Income-Tax.

In the Scottish Courts of Law recently, the First Division heard an Exchequer case in which the Largs and Lundin Links Gas Company, Ltd., appealed against a decision of the Commissioners upholding the contentions of the Inspector of Taxes, Cupar, when he refused to allow the Company a deduction of £72 10s., being one-sixth of the assessment of £435 in which they had been found liable for the year ended April 5, 1920. The Division refused the appeal, with expenses. The Lord President stated that the Company, as owners of the gas-works, had been assessed for income-tax; and the gains were to be treated as the profits of one concern. The Inspector of Taxes offered to deduct one-sixth of the estimated value of certain parts of the Company's premises which he was willing to admit fell under the description of "mills, factories, or similar premises." The Company contended that they were entitled to a deduction of one-sixth part of the assessed profits of the whole concern. The question raised was: "Were the Company's whole premises a mill or factory, or similar to these premises; and, if so, was the annual value of their premises measured by the annual value of the profits of their concern?" It was clear that the first point could not be determined by this appeal; and the second thus became really hypothetical. Therefore, in the circumstances, the Division could not answer either of the points put before them.

Buckie Gas Company.—It was stated at the annual meeting of the Company that there had been an increase in consumption of 1¾ million c.ft., when compared with the previous year. The financial surplus for the year is £1849.

Cheap Gas at Alloa.—Alloa is stated to be the town in Scotland with the lowest gas rate. The price has just been reduced from 3s. 3d. to 2s. 11d. per 1000 c.ft. At Kelso the price has been reduced by 5d., to 5s. 5d. per 1000 c.ft.

Increased Consumption at Colwyn Bay.—Some interesting figures with regard to the consumption of gas for the year ended March 31 last were presented by the Engineer to the Lighting Committee of the Colwyn Bay Urban Council last week. The total gas sold for the year was 135,813,100 c.ft., as against 129,525,400 c.ft. the previous year. The total quantity of gas made in the year was 147,761,000 c.ft., against 141,758,000 c.ft. in 1921. The unaccounted-for gas was 6·44 p.ct., as compared with 7·04 p.ct. in 1921. The total increased consumption of gas by consumers for the year was 6,287,700 c.ft.

Nantwich Gas Finances.—In moving the adoption of the minutes of the Gas Committee at a meeting of the Nantwich Urban Council last week, Mr. A. Rollings said they had prepared the annual accounts, subject to the Government audit. It had been necessary for the gas undertaking to apply for £164 from the rates; but this was much less than they at first anticipated, and they could congratulate themselves that they had not required a larger amount. If they had not put up the price at the time they did, the call upon the rates would have been considerably more. He was very optimistic with regard to the future of the undertaking, and thought they might look forward to a further reduction in the price of gas in the near future.

Chesterfield Gas Undertaking.—The members of the Chesterfield Corporation have paid a visit of inspection to the gas-works, which proved both interesting and profitable. Under the able leadership of the Gas Engineer (Mr. Harold Davies), they viewed the various gas-making processes, which were exhaustively explained. The output of gas from the Corporation's undertakings during the current year will be from 340 to 360 million c.ft. Alderman Clark (the Chairman of the Gas Committee) said he had been anxious for a long time that the members of the Corporation should see the gas-works, and should understand something of what was being done. He urged the desirability of having a central gas showroom in Chesterfield, and he believed if such a room was dealt with in a business-like way a lot of money could be made out of it. He considered there was not enough done in Chesterfield in the way of heating and cooking with gas; and the Committee had to set about to develop the demand. If they could get such a proposition put before the Corporation, he felt sure it would receive the support of everyone.

MISCELLANEOUS NEWS.

THE GAS LIGHT AND COKE COMPANY.

Quarterly Official Tests.

The Gas Referees have made their report for the quarter ended March 31 upon the gas supplied by the Gas Light and Coke Company. The Company were required to supply gas of an average calorific value for the quarter of not less than 475 B.Th.U. gross per cubic foot, at which value 1000 c.ft. are equivalent to 4·75 therms.

The average calorific value for the quarter was 478·9 B.Th.U. gross.

On no day in the quarter was the calorific value at any testing-place deficient by 6 p.ct. or more.

No trace of sulphuretted hydrogen was found at any testing-place on any day during the quarter, except on one day at one testing-place which samples the gas supplied from the Kensal Green works of the Company to Willesden and adjacent localities. The Chief Gas Examiner has decided "that this default was not substantial, and that no forfeiture should be incurred by the undertakers in consequence. The default is counterbalanced by the long and good record of the Company."

On no day in the quarter was the pressure at any testing-place less than 2 in.

Therefore the Company have fulfilled their statutory obligations in respect of the calorific value and pressure of the gas supplied throughout their district during the quarter ended March 31, and have substantially fulfilled them in respect of purity.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" regarding applications to the Board of Trade for Orders under the Gas Regulation Act.

Horsham Gas Company, Ltd.

The maximum price now authorized in respect of the supply of gas by the undertakers is 4s. 7d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 7d. per therm.

SPECIAL ORDERS.

Barnsley Gas Company.

The Company are applying to the Board of Trade for a Special Order under section 10, to authorize them to increase their borrowing powers, to enable them to purchase gas, and to make new provisions regulating administration and the supply of gas.

Harwich Gas and Coke Company, Ltd.

Application is intended to be made by the Company for a Special Order to authorize them to erect works on land scheduled.

Haslemere and District Gas Company.

Notice is given by the Company of their intention to apply for a Special Order to enable them to carry out work on scheduled land.

DECLARATIONS OF CALORIFIC POWER.

Alnwick Gas Company.—500 B.Th.U. (June 29.)
Brixham Gas Company.—500 B.Th.U. (June 30.)
Portishead Gas Company, Ltd.—550 B.Th.U. (July 1.)
Warminster Gas and Coke Company.—500 B.Th.U. (July 1.)
Witney Gas and Coke Company, Ltd.—450 B.Th.U. (July 1.)

GAS REGULATION ACT ORDERS.

We have received from the Director of Gas Administration copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Bideford Gas and Coke Company, Ltd.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 13·6d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five-and-one-fifth.

Prepayment meter clauses are included. (June 21.)

Brixham Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15·2d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-three-quarters. (June 26.)

Denton Urban District Council.

As from the declared date, the maximum price in respect of gas supplied by the undertakers shall be 20d. per therm.

As from the declared date, the following rates of discount shall have effect in lieu of the rates of discount authorized by section 43 (discount to large consumers) of the Dukinfield and Denton Local Boards (Gas) Act, 1877. On a quarterly consumption exceeding 250 therms and not exceeding 500 therms, 0·2d. per therm; exceeding 500 therms and not exceeding 1000 therms, 0·4d. per therm; exceeding 1000 therms and not exceeding 2000 therms, 0·6d. per therm; exceeding 2000 therms and not exceeding 4000 therms, 0·8d. per therm; and exceeding 4000 therms, 1d. per therm. (June 29.)

Emsworth Gas and Coke Company, Ltd.

After the declared date: (1) The standard price in respect of gas supplied by the undertakers shall be 16·2d. per therm; and (2) the price of 17·4d. per therm shall be substituted for the price of 5s. 6d. per 1000 c.ft. mentioned in the second proviso to section 22 (fixing maximum price of gas with sliding-scale as to dividend) of the Emsworth Gas Order, 1884.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five. (June 28.)

Freshwater Gas Company, Ltd.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 19d. per therm; and this price shall be substituted for the price of 5s. per 1000 c.ft. wherever it occurs in section 19 (price of gas) of the Freshwater Gas Order, 1899.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and the words "fifth of a penny" shall be substituted for the word "penny" wherever it occurs in paragraph (ii.) of Schedule B to the Freshwater Gas Order, 1899. (June 28.)

Greenock Corporation.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 15d. per therm.

Prepayment meter clauses are included. (June 27.)

Launceston Gas Company, Ltd.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15·4d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five.

Prepayment meter clauses are included. (June 21.)

Ripley Gas Company, Ltd.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 12·6d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-one-half. (June 29.)

Warminster Gas and Coke Company, Ltd.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15·6d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five.

After the declared date, "1·2d." shall be substituted for "6d.," and the word "therm" shall be substituted for "1000 c.ft." wherever occurring in section 28 (price of gas for public lamps) of the Warminster Gas Order, 1889. (June 23.)

National Gas Competition Prize Distribution.

The British Commercial Gas Association recently held a "fairy gas" painting and verse-composing competition, and of the national prizes awarded for England, Ireland, and Wales, Birmingham scholars won two first, 13 second, and 48 consolation prizes. In addition to the national prizes, 32 were awarded by the Gas Committee to Birmingham children; and these awards were presented on Tuesday by the Lady Mayoress of Birmingham (Mrs. D. Davis) to the successful scholars, at the Municipal Technical School, Birmingham. There was a very large attendance, at which Alderman J. H. Lloyd (the Chairman of the Gas Committee) presided. He was supported by the Lord Mayor, Alderman Bird, Messrs. Thornton and Whitehouse (members of the Gas Committee), and Arthur W. Smith (General Manager and Secretary of the Gas Department). It was stated that out of nearly 8000 forms distributed by the Birmingham Gas Department about 1000 were returned for the competition. Of the national prizes awarded, Noel Wass (11), Aubyn House School, Moseley, won the first prize of £5 for boys over ten years, and Teddy Cornforth (8½), of Streetly Preparatory School, won the first prize of £2 for boys under ten years; both premier national prizes for boys thus going to Birmingham. These two boys also won the first prizes offered by the Birmingham Gas Department for their respective classes. An independent artist, reporting on the competition, said that Birmingham had the highest standard of work in England, Ireland, and Wales. In England, the largest number of entries were from Birmingham, Coventry, Stafford, Walsall, and York. Alderman Lloyd warmly congratulated the children of Birmingham upon their artistic ability and the facility they had displayed in verse making, in continuation of a familiar nursery rhyme.

Price Reduced at Matlock.—The Matlock Gas Company have decided to reduce the price of gas 4d. per 1000 c.ft., making the charge 5s.

Maintenance of Appliances.—The Gas Committee of the Glasgow Corporation are considering a report by Mr. J. W. M'Lusky (the General Manager), in regard to forming a staff which would be employed in the inspection of consumers' gas-fittings and keeping them in good working order. The proposal is to overhaul appliances every three months. As to the cost of upkeep of the department, it would require a staff of 400 men, including foremen, clerks, and a superintendent. Adding £2838 for material used for repairs, the estimated cost of the scheme for Glasgow would be £61,578. Based on an annual sale of 9000 million c.ft. of gas, an expenditure of this amount would equal 1·64d. per 1000 c.ft. It is estimated that the cost of making the experiment in the Bridgeton supply area of the city would be about £1000.

SOUTH AFRICAN LIGHTING ASSOCIATION, LTD.

The Ordinary General Meeting of the Association was held last Wednesday, at the London Offices, No. 90, Cannon Street, E.C.—Mr. WILLIAM CASH, F.C.A., in the chair.

The SECRETARY (Mr. William Cash, jun.) read the notice convening the meeting, the minutes of the last meeting, and the report of the Auditors. The Directors' report and the statement of accounts were taken as read.

CHANGES IN THE CONSTITUTION OF THE BOARD.

The CHAIRMAN, on rising to move the adoption of the report and accounts, remarked that, at the shareholders' meeting a year ago, his predecessor in the chair (the late Sir Daniel F. Goddard) announced that the Board had done him (Mr. Cash) the honour of electing him to a seat among them, in place of Mr. Don, whose lamented death was then reported. After the lapse of only one year, he (Mr. Cash) found himself in the chair at that meeting, occupying the position Sir Daniel Goddard so well filled. The Directors in their report informed them that they had had the misfortune to lose Mr. James Macalister—a most useful Director—in March of this year. He had been connected practically all his business life with South Africa. In particular, he was a Director of the National Bank of South Africa. As a member of their own Board, he was always keenly interested in the affairs of the Association. The Directors had the highest regard for him; and his removal by death was a great loss to the Company. To replace Mr. Macalister, the Directors had elected Mr. T. N. G. Jennings, who had been connected for a great many years with the Standard Bank of South Africa. He had spent a large part of his life in South Africa, and for a period of eight years had held a most important position in the Bank there, and, further, during this time, he had lived in Port Elizabeth, where the Association's principal station was situated. He (Mr. Cash) thought they would agree with him in saying that Mr. Jennings having consented to act as a Director would be a great advantage to them, and that his local knowledge and experience of affairs in South Africa would be of much value to the Board. Then he came to what had been, perhaps, the most serious loss of all to the Association—that was the death in May this year of Sir Daniel Goddard. As was stated in the report, and as they all knew quite well, he had been Chairman of the Association since its formation in 1888. They also knew that he had had a lifelong connection with the gas industry. He possessed wide experience both of gas engineering and of gas administration; and he brought to their Board qualifications of exceptional value, which had proved of the greatest usefulness to the Association throughout its history. Under his wise guidance, the Association had made considerable progress—and he thought they might claim that it had been a success. He felt sure that the shareholders would acquiesce in the resolutions which the Board had passed, and which had been conveyed to the family, deploring the loss which the Association had sustained by his removal. The Board regarded themselves as very fortunate in having obtained the consent of Sir Charles Jessel to fill the vacancy thus created. His name was so well known in the industry that no additional statement was necessary from him (Mr. Cash) in justification of the opinion that it would be a great advantage to the Association, as it would be to the Board, to have the benefit of his ripe experience. Sir Charles Jessel had been a Director of a very large undertaking—the Imperial Continental Gas Association—for over a quarter-of-a-century; and for nine years he had been Chairman. In one sense—though their own Association was a very small concern compared with the other—they ran on somewhat similar lines; and it would be a great advantage to them to have his help. Sir Charles Jessel was also on other Boards, and brought a seasoned judgment to bear upon all matters which came before him. It was a curious fact that there had been so many alterations in the Board in such a comparatively short period; and as far as he (Mr. Cash) personally was concerned, he must ask them, in judging him, to bear in mind that he was following so experienced a Chairman as Sir Daniel Goddard.

THE ACCOUNTS.

After these few preliminary observations, he would refer to the main features of the accounts. The principal matter was the exceptional repairs carried out during the past year. They would realize, he was sure, that these had had to be undertaken at a time when wages were high, and when the material which they had had to send from this country in advance was particularly costly. These repairs had been called for mainly owing to the difficulty of getting material abroad during the war, which had caused them to have an accumulation over a certain number of years. While they had an expensive man as a retort-setter sent out there, they thought it well to make the best use they could of his services; and they retained him longer than was originally intended, both at Port Elizabeth and Grahamstown. As a result of this exceptional expenditure, they had during the past year transferred quite a substantial sum (having regard to the size of the undertaking) from the ordinary visible reserve to special reserve account, so as to lighten the charge and burden on this particular year's working. The Directors thought this was a thing they were perfectly justified in doing, because they had built-up this reserve to meet emergencies; and the balance which remained was still substantial, having regard to the size of the undertaking.

GAS STATISTICS.

Then, turning to the output, it was satisfactory to find that in Port Elizabeth they had an increase of over 4 p.ct. in the output on the year, and at Grahamstown an increase of over 7 p.ct. They would doubtless also agree that it was another very satisfactory feature that the consumption per consumer was going steadily up at both places, and last year reached the highest figure they had ever touched. The total number of consumers in Port Elizabeth showed a small decrease, and in Grahamstown a small increase. There was one other matter, however, which was not satisfactory. The report told them that the working results had not been so good; and it was in connection with the leakage of gas, to which the Chairman referred a year ago. In fact, at Port Elizabeth the leakage had reached a figure which caused the Board considerable concern. The officials out there were alive to the seriousness of the matter; and their Engineer (Mr. J. F. Scott) had been in constant communication with the officials on the subject. The Board had had that day certain additional reports, right up to date, which gave them information as to how the trouble might be arising. Primarily they believed it was because the meters had, perhaps, not been looked after so closely as they should have been, consequent upon the difficulty of getting material to South Africa; and partly the leakage might have arisen in the streets. The Directors were asking for further information, and would not rest until they had this trouble reduced to reasonable proportions. In the first quarter of this year there had been an improvement; but even for that quarter the figure was much too high. The price of gas remained the same at both stations throughout 1921. The price of residuals had been down; and the quantities, also, were not so entirely satisfactory. The sale of fittings had kept up really in a wonderful manner.

THE DIVIDEND.

As the result of the year's working, though they had not quite earned it, the Directors thought it reasonable to pay the dividend which they recommended, which was 7½ p.ct., less income-tax (and this was a matter to which he invited their careful attention) at the rate of only 2s. 5d. in the pound. This was the rate agreed upon with the authorities here, having regard to the refund which the Association got back in respect of the Colonial tax paid on the other side. For the year 1920 they paid 8 p.ct., less 4s. tax, which was a net return of £6 8s.; and this year they were paying a slightly smaller dividend of 7½ p.ct., less income-tax of only 3s. 3d., which was equal to £6 5s. 7d. So that the dividend this year was nearly identical, expressed as a net sum, with what they paid a year ago. It would be seen from the printed accounts that there was a charge this year for income-tax which they did not have last year; and in the profit and loss account they would notice that Colonial tax and the English corporation tax were rather more than a year ago. Putting the two figures together, they had had to pay £1000, as compared with £908 a year ago. Under the head of capital expenditure, they had written off another £500 for the carburetted water-gas plant at Port Elizabeth, making a total sum of £4000; and they were now coming nearly to the end of this writing off. This sum had been included as part of the working expenses in arriving at the result before them.

THE GRAHAMSTOWN CONCESSION.

The shareholders would perhaps expect him to say a word or two with regard to the Grahamstown concession. The matter might be summed up in this way. They had taken no further steps. The town had authorized a scheme for the provision of electric light; and the Board understood that the Corporation were obtaining estimates for this. But at the same time they were not proceeding with their new water scheme, which had been postponed on account of the cost. It did, however, seem to him that there might be some possibility of the electric light scheme having to be put off, by reason of the action of the authorities, until the water scheme was carried out, and that therefore they need not expect this competition at a very early date at any rate. He regretted to say that there was an attack made upon the administration of the Company in Grahamstown during the past year, due to the fact that certain consumers thought they were not getting a satisfactory supply; and the Corporation set up a Committee of Investigation. He thought he might claim that the Association had emerged entirely satisfactorily from these proceedings. The Directors published their reply to the Committee's report, which was not really a serious matter at all; and all the reflections made upon the Association were, he thought, refuted. There was a good deal of talk going on in South Africa with regard to further local taxation. At present there was no definite news as to exactly what form this would take; but such schemes as had been promulgated rather contemplated a tax upon turnover, with power, however, if such a tax was applicable (say) to the sale of gas, to pass on the additional charge to the consumer. The principles of taxation must be a matter for the local Legislature; but the view of the Board was that such a tax would not be good finance, and they could only hope it would not be found necessary to proceed in this direction, after the authorities had fully considered the matter.

THE FUTURE.

Looking to the future, the business continued to grow. At Port Elizabeth to date this year they had had an increase in sales, though not so large as last year, probably due to the depression in trade; but at Grahamstown the increase was very nearly 9 p.ct., which was quite satisfactory. In this connection, it was rather interesting to find, going back four years, and comparing 1917 with 1921, that the consumption at Grahamstown had gone up from 16 to nearly 23¾ million c.ft., and that at Port Elizabeth from 43¾ to about 60½ million c.ft. So that over this period they had continued steadily to progress. He would ask Mr. Woodall, who was still with them, and they hoped would remain for many years longer, to second the resolution.

Mr. HENRY WOODALL said it was a great pleasure to him to second the resolution. The Chairman had referred to matters which by some might be regarded as somewhat prejudicial to the Association's prospects; but he rather looked upon some of these matters as promising a greater state of prosperity in the coming year. To begin with, the expenditure on repairs had been so very considerable that they were relieved from the necessity of spending in anything like the same proportion for years to come. At Port Elizabeth he did not expect they would have to spend anything on retorts for at least three years. Leakage was a matter that could only arise from extraordinary circumstances; and he thought it was impossible that the cause of this leakage could fail to be ascertained within a period of twelve months. So he would advise them all, if they had an opportunity of buying the Association's shares, to do so now, in this time of trouble, for it was quite certain that the dividend would improve in the near future.

Mr. F. R. SMITH said it would be agreed that the matter was sufficiently serious to be taken in hand immediately; and he would suggest to the Directors that it might be worth while even to

send an expert out to South Africa promptly, thoroughly to investigate the matter. It would be worth incurring any trouble and expense to overcome it.

Mr. A. J. KINGDON asked whether this trouble was experienced at both works.

The CHAIRMAN said it was not.

Mr. KINGDON: What is the percentage at the other works?

The CHAIRMAN: Under 3. Continuing, he said the Board had gone so far as to make inquiries regarding a suitable man to send out, if they failed to get satisfaction by correspondence. There were various avenues of investigation; and the shareholders might rest assured that the Board would pursue them all.

The resolution was then carried.

The CHAIRMAN next proposed that a dividend be paid at the rate of 7½ p.ct. for the year, subject to income-tax at 2s. 5d. in the pound, and less the interim dividend already paid.

Sir CHARLES J. JESSEL, Bart., in seconding, said that his accession to the Board was of so recent a date that it would be really impertinent of him to make any remarks on the affairs of the Association. He could only say that he had had an experience of over 25 years with gas companies situated at some distance from London. He was pleased to be thus associated with Mr. Cash, as he was in connection with another company; and he could assure the shareholders that what little services he could render would be done with the heartiest goodwill.

The motion was agreed to.

The CHAIRMAN said that Sir Charles Jessel having taken the place of Sir Daniel Goddard, whose turn it would have been to retire, it fell to the shareholders to re-elect him to the position he had just accepted. He had pleasure in proposing this.

Mr. T. N. G. JENNINGS seconding, said he was sure Sir Charles Jessel would prove a very valuable asset to the Association. As to himself, though he had had no experience of the running of a gas concern, yet he had been associated with South Africa all his life. He hoped his knowledge of South Africa and South African affairs might be of some use.

The resolution was carried; and thereafter the retiring Auditor (Mr. P. D. Griffiths) was re-appointed, on the proposition of Mr. KINGDON, seconded by Mr. F. D. MARSHALL.

The CHAIRMAN, proposing a hearty vote of thanks to the officers and staff, said they had had a rather trying year, under all the circumstances to which he had referred; and he was sure the shareholders would like to acknowledge the work they had done.

Mr. WOODALL seconded this, and it was passed, as was also a vote of thanks to the Chairman and Directors, on the motion of Mr. SMITH, seconded by Mr. KINGDON.

LANCASTER CORPORATION GAS-WORKS.

Mr. George Dixon, B. Eng., Engineer and Manager of the Lancaster Corporation Gas-Works, in his annual report, shows receipts amounting to £88,075, and expenditure to £71,942. The gross profit of £16,133 has been allocated as follows: Interest, £2605; redemption fund, £3256; income-tax, £4033; net profit, £6237. A sum of £5000 has been taken for relief of the rates, and the balance of £1237 placed to reserve, which now stands at £16,317. Coal cost £37,091, averaging 35s. 5·67d. per ton, against 39s. 1·34d. the previous year. Residuals realized £26,044, equal to 70·2 p.ct. of the total cost of coal, against 83·8 p.ct. The average price of gas per 1000 c.ft. was 3s. 3·79d.; and the cost of manufacturing and distributing it was 2s. 0·27d. per 1000 c.ft. New mains absorbed 2·30d.; income-tax, 3·31d.; interest, 2·12d.; and redemption fund, 2·67d.; the net profit being 5·12d. per 1000 c.ft. The unaccounted-for gas amounted to 3·9 p.ct.

During the coal strike the department had sufficient coal in stock to maintain normal pressure; and they also sold 366 tons of fuel to meet the demands in the town. The strike and the change in gas-making processes to meet possible contingencies left its mark in the formation of naphthalene crystals in the mains and services, causing trouble to consumers for nearly three months. The works plant had been maintained in good condition; but some renewals had been left over to meet the necessity for economy, and to encourage trade by keeping down the price of gas. The slump in the residual market, and the loss of revenue due to decreased gas consumption, out-weighed the reduction in manufacturing costs due to cheaper coal and labour. The department have been asked to find £3000 for the relief of the rates next year, equivalent to 3d. per 1000 c.ft. on the price of gas.

According to the Borough Treasurer's report, the output of the works last year was 307,151,000 c.ft., of which 271,134,757 c.ft. was sold to private consumers, 21,898,004 c.ft. for public lighting, and 4,063,700 c.ft. was used on works and offices. The price of gas was 3s. 5d. to 3s. 11d. per 1000 c.ft., less 2d. discount, for ordinary consumers.

A Further Reduction in Price at Liverpool.—After the June quarter meter readings, the Liverpool Gas Company will further reduce to 9d. per therm the price of gas to consumers through ordinary meters. For gas supplied through prepayment meters, the charge will be lowered to 10·53d. per therm. For large consumptions in single premises (on accounts paid within a month) discounts from 2½ p.ct. upwards, according to consumption, will be allowed.

Teignmouth Urban Council Gas Supply.—Reporting on the past year's working of the gas undertaking of the Teignmouth Urban District Council, Mr. H. Higham (the Engineer and Manager) says the result is a net profit of £326, making the credit balance of the department £2963. The profit of £326 has been made after reducing the price of gas twice during the year, by 6d. and 5d., making a present price of 5s. 10d. per 1000 c.ft., and also after allocating certain sums out of the revenue of the department for the improvement of the works, in place of borrowing capital at the prevailing high rate of interest. A steady increase has been shown in the sales of gas. The make of gas for the year was 60,702,000 c.ft. Various new work is in hand.

A LOSS AT BURTON-ON-TRENT.

The Mayor of Burton-on-Trent (Mr. A. H. Yeomans), who is also Chairman of the Gas Committee), in presenting the annual report of the undertaking, said for the first time in its existence a large loss had been disclosed; and he was sorry it fell to him to make the announcement. The loss during the past financial year had been £15,609; and the cause of this to a large extent was the disastrous coal strike. On the sale of residuals there was a decreased revenue of £28,156, compared with the previous year. This sum was made up as follows: Decrease in the sale of coke, £17,426; in the sale of tar, £6277; and in the sale of ammoniacal liquor, £4453. The Committee knew so far back as last July that things were going badly; and it was decided to have a half-year's balance got out to the end of September. The result was that a loss was shown of over £18,000. A question arose as to whether they should apply to the Board of Trade for power to increase their charge to ordinary consumers from 4s. 6d. to 5s. 6d. per 1000 c.ft.; but they were informed that if this concession was granted the Committee would not be able to use any future profits for the relief of the rates. After very careful consideration, the Committee came to the conclusion that the effects of the strike were of a temporary nature, and that if they shouldered the loss there were hopes of a brighter time in the second half year. This had proved to be the case, for the loss on the whole year was £15,609. The actual cost of the gas made amounted to 5s. 4d. per 1000 c.ft., which, on the selling price of 4s. 6d., meant a loss of 10d. per 1000 c.ft. He was sorry to say that the Committee could not see their way clear to make a reduction in the price for the present; but they had decided to have the accounts got out in September, and if they revealed satisfactory progress they would then consider a reduction.

Mr. LEAN criticized the report, and described the members as "financial purists" with gas accounts and "financial jugglers" with electricity.

Alderman ROWLANDS said the same difficulties had been met with at other places; and he thought the result was very creditable. On the question of a reserve fund, he had always been a strong believer in a substantial amount under this head; and he noticed that this year it had been depleted to a level of £3000 odd. One of the first considerations of the Committee should be to build it up again.

After a little further discussion, the report was adopted.

TIPTON GAS UNDERTAKING DEFICIT.

The annual statement of accounts in connection with the Tipton gas undertaking was presented to a meeting of the Urban District Council last week. The statement on the expenditure side showed that coal and expenses of depositing it on the works, including wages of stokers (£3940), amounted to £35,385; purification, including wages and materials, £442 9s. 4d.; repairs and maintenance of buildings, plant, machinery, &c., £3428; residual products, £788 2s. 8d.; repairs and maintenance of mains and services, £1163; meters, £1021; lighting and repairing public lamps, £688; gas stoves and fittings and wages, £2866. The total amount of the working expenses was £54,469.

The income side showed: Sale of gas, £31,052; residual products, £15,754; rental of meters, &c., £699; sundry revenue, £3467. The gross income was £50,974, less discounts and other allowances and bad debts reserve (£2257), £48,716; balance carried to net revenue account (£5752), £54,469; showing a loss of £10,235.

The net revenue account showed the following expenditure: Interest on loans, £932; instalment of loans, £2794; provision for accrued charges, £756—making £4482; revenue account, gross loss on working, £5752—a total of £10,235, which was transferred to accumulated profits account.

A special report was also read, in which it was stated that in the opinion of the Sub-Committee the deficit was due to the excessive price of coal during the strike, the quantity of residuals, and the inferior quality of them. A further report suggesting the remedy included the enlargement of the concern, and that application should be made to the Ministry of Health for sanction to the necessary loan.

Discussing the report, Councillor GEORGE urged that a sub-committee should be constituted directors of the gas-works, with full power to see why the works did not pay. It was his opinion the town had a little gold mine.

Councillor DOUGHTY said it was inopportune to spend money on alterations and extensions, as engineers to-day were being paid a wage that would be considerably reduced in the near future. He believed that prices would be down by 25 p.ct. if the matter of the alterations was left over until February. He suggested that course.

The reports were then accepted; and Councillor SALTER gave notice to move at the next meeting that the resolution of November, 1898, delegating the powers of the Council to the Gas Committee should be rescinded, and that all reports of the Gas Committee should be submitted to the Council and discussed in the same manner as the reports of other standing committees.

The Council also gave authority to the Clerk to take the necessary steps for the change from cubic feet into therms for charges.

Gas Company's Electricity Powers Revoked.—The Minister of Transport notifies that he has revoked the Deal and Walmer Gas and Electricity Act, 1914, as to the whole of the area for the supply of electricity under the Act, as from June 13, 1922.

Birmingham Gas Prices.—The Birmingham Gas Committee have decided to recommend the City Council to reduce the price of gas 8d. per 1000 c.ft. from the September readings of the meters. This reduction will apply to all classes of gas consumers. The reduction in prospect will be the third to be made this year. Last year the price was 5s. 6d. per 1000 c.ft., which by two instalments (of 6d. each) was brought down to 4s. 6d. When reduced to 3s. 10d., as now proposed, it will be the same as that which obtained in July, 1919.

ETRURIA WORKS HANDED OVER TO STOKE.

At the meeting of the Stoke-on-Trent Town Council last Thursday, it was reported that the Gas Committee had received a letter from the Secretary of the British Gas Light Company with regard to the arrangements for the transfer, and that instructions had been given (1) that the services of the clerical staff required by the Company subsequent to June 30 for the purpose of making up the accounts to that date shall be paid for by the Company, and (2) that the necessary action be taken to dispense with the services of the Company's Engineer forthwith on the transfer of the undertaking to the Corporation.

When the Finance Committee met on June 21, the Town Clerk reported that the arrangements were then complete for the transfer of the undertaking, and that the sum of £345,000 payable to the British Gas Light Company would be required on June 30. It was resolved that the Borough Treasurer be instructed to make the necessary arrangements for the payment of the amount.

The Corporation taking over on Friday the Etruria Gas-Works marks the beginning of a scheme for the unification of the four undertakings of the Corporation at Burslem, Stoke, Fenton, and Longton, and the establishment of the undertaking at Etruria as a central concern for the Potteries. At the Company's premises in Hanley, the Mayor of Stoke-on-Trent (Alderman S. Sproston) handed to Mr. A. W. Brookes, the Secretary of the British Gas Light Company, a cheque for £345,000 in respect of the purchase. The Corporation also take over debentures of £40,000. In celebration of the occasion, Alderman A. Brookhouse entertained the members of the Committee and the representatives of the Company at luncheon.

Alderman Brookhouse, in proposing the toast of "The British Gas Light Company, Ltd.," said he was delighted to see his friend Mr. Brookes. He regretted the enforced absence, owing to other business matters, of the Chairman of the Company (Mr. Henry Woodall). He desired to acknowledge the courtesy, candour, and goodwill with which the Company had met the representatives of the Corporation throughout the negotiations. Mr. Corbet Woodall (afterwards Sir Corbet) gave evidence in reference to the gas undertakings in connection with the inquiry relating to the proposed federation of Longton, Fenton, and Stoke; and it had been a delight to him (the speaker) to meet his son, Mr. Henry Woodall, in connection with the present purchase. The purchase was now an accomplished fact; and the time was undoubtedly opportune for it. He had no doubt whatever as to future results; for he had every confidence in Mr. Mackay (the Gas Engineer).

Mr. A. W. Brookes, responding, said it had been stated that the British Gas Light Company had named £500,000 as the lowest price they would take for their Potteries undertaking, and that, after being approached by representatives of the Corporation, they saw the necessity of reducing that figure to considerably below £400,000. The sum of £500,000 had been mentioned on several occasions; but it was never named by the Company. The statement was not only misleading, but it was entirely foreign to the spirit in which the negotiations throughout were conducted. There was little difference between the valuation by the Corporation's experts and the valuation put forward by the Company; and a very little concession on either side enabled them soon to arrive at an agreement. He desired to acknowledge the graceful way in which Alderman Brookhouse had more than once referred to the friendly and straightforward manner in which the Corporation representatives had been met by the Company. The Company appreciated the courteous manner in which the Corporation approached them, and the consideration they were always willing to give to the Company's point of view. Subsequent to the agreement, a very great concession was made by the Company. He alluded to the agreement by the Directors to accept total payment in cash, instead of part payment in cash and a large sum in Corporation 6 p.ct. stock. The Corporation were exceedingly fortunate that the Directors were able to meet them in this respect; for it so happened that the Company were in immediate need of money for expenditure on their other stations. For that reason they were able to accept payment in cash, thus obviating the necessity of raising new capital. Mr. Brookes paid a high tribute to the ability of Mr. C. Rhodes Armitage, who now relinquished control of the undertaking. The Company, he said, had a large and efficient staff in the Potteries. The Chairman of the Company regretted his inability to be present that day; but he desired to invite the Mayor and representatives of the Corporation to take lunch with him when their accounts were finished and a final settlement was made. Concluding, he said: "Loth as I am to see the Company lose one of its stations, I can now heartily congratulate you upon having acquired our Potteries station. I am quite sure that the scheme of unification is right; and I hope that in the future your adoption of the scheme will be justified, and your highest expectations realized." [Applause.]

Recalling the negotiations, the "Staffordshire Sentinel" says: "A very difficult engineering scheme, of course, remains to be carried through in the concentration of the manufacture of gas to the Etruria works. We understand from the Gas Engineer that, having regard to the fact that he will have heavy standing charges hanging over the department, it is his intention to recommend that this concentrating work be immediately begun. In fact, we understand that he already has plans and specifications prepared to place before his Committee. His ideas, of course, are to erect the most up-to-date manufacturing plant and to enlarge and add to the existing plant at the Etruria works; the gas manufactured at that centre to be conveyed through large steel mains. These mains will be welded together into one solid length, which will convey the gas to the Corporation's holders at present in existence; and from these holders it will be distributed to each of the areas. It is also his intention so to arrange the gas supply that at any time when the holder will be under repair, the high-pressure gas will be governed to a suitable pressure for distribution without being conveyed to the holders. The general residuals received by the Corporation from the carbonization of coal have for very many years been sold to chemical works; and it is well known that the shareholders of these works have always had a very substantial return for the money invested. This part of the profits derived from gas manufacture, we understand, will be retained for the benefit of the borough and the gas consumers, as it is Mr. Mackay's intention to erect a chemical works, not only for the distillation of tar and the manufacture of sulphate of ammonia, but also for the manufacture of chemicals used in the process of gas purification and the working-up of residuals. Indeed, Mr. Mackay has full faith that the profits thus obtained, together with the saving of expenditure on the old works, on which a very large expenditure would have been necessary but for this concentration, and the combination of efficiency and economy generally, will render this a very sound and profitable transaction for the county borough—an optimism which we all share. In connection with the negotiations just completed with the British Gas Light Company's Directors, this *résumé* would not be complete without a word of appreciation of Alderman Brookhouse, J.P., the Chairman of the Gas Committee. It is fully recognized that the Alderman has taken a very lively interest in the affairs of the Gas Committee since becoming Chairman of that Committee. During all the interviews, we are led to understand, his municipal experience was exceptionally helpful; and he brought to bear his keen intelligence in the negotiations, which at all times required the most careful tact and business ability. A word of praise is also due to the other members of the Sub-Committee, and the Committee generally."

STOKE-ON-TRENT GAS SUPPLY.

The accounts of the Gas Department of the County Borough of Stoke-on-Trent for the year ended March 31 contain the following table of general results prepared by Mr. A. Mackay, Chief Engineer and Manager.

General Results for the Year Ended March 31, 1922.

—	Burslem.	Stoke.	Fenton.	Longton.
	Cubic Feet.	Cubic Feet.	Cubic Feet.	Cubic Feet.
Coal gas made . .	251,215,000	159,883,000	149,357,000	156,699,000
Water gas made . .	..	..	..	35,693,000
	251,215,000	159,883,000	149,357,000	192,392,000
Gas sold—				
Ordinary meters .	108,237,400	53,451,400	61,585,100	70,251,900
Automatic meters .	105,658,100	76,983,600	66,269,700	93,104,800
Public lighting . .	10,186,600	12,641,400	6,488,200	9,540,100
Used on works, &c. .	2,976,300	1,337,600	1,034,200	1,465,500
Unaccounted for . .	24,156,600	15,469,000	13,980,400	18,029,700
	251,215,000	159,883,000	149,357,000	192,392,000
Decrease of gas sold under previous year	13,001,800	8,660,400	17,004,200	2,325,800
Decrease of gas sold—p.ct.	5·48	5·77	11·23	1·32
Coal carbonized (tons)	18,150	11,746	11,124	11,534
Gas made per ton (c.ft.)	13,840	13,611	13,426	13,612
Gas sold per ton (c.ft.)	12,346	12,180	12,077	12,209
Gas unaccounted for p.ct. on make . .	9·61	9·68	9·36	9·37

In a statement drawn-up by him, Mr. Mackay said that, speaking generally, the year had closed very satisfactorily—especially having regard to the difficulties experienced. The extra cost involved by the miners' strike amounted practically to £14,000. On account of the dislocation taking place in the industrial world during the strike, and also since that time, the quantity of gas made, as compared with the previous year, was fully 46 million c.ft. less. The Fenton area suffered most, on account of the slackness of a number of engineering firms in that area. The average decrease in the quantity of gas made during the year for the four works was 5·83 p.ct. In spite of inferior coal during the strike period, the average make of gas per ton of coal for the four works was 13,622 c.ft.; while the average when Mr. Mackay took over the works was 12,981 c.ft. At the same time he has reduced by 5 p.ct. the unaccounted-for gas. As compared with the preceding year, residuals on the present occasion show a falling off of £27,716. In view of the financial position, he felt justified in recommending his Committee to reduce the price; and this has been acted upon.

The Gas Committee had passed the following resolutions: "That as from July 1 the price of gas be reduced: In the Burslem area, from 4s. to 3s. 8d. per 1000 c.ft. net; Fenton, from 4s. 6d. to 4s. 4d.; Longton, from 5s. to 4s. 6d.; Stoke, from 5s. to 4s. 10d. That the price of coke at the gas-works be reduced from 40s. to 30s. per ton."

In submitting the accounts to the Council, Alderman A. Brookhouse (the Chairman of the Gas Committee) said that, after providing for interest and sinking fund charges, the following results were shown: Burslem works, a loss of £131; Stoke works, a loss of £1749; Fenton works, a loss of £2923; Longton works, a credit balance of £399. The reason for the large deficit at Fenton was that the consumption of gas decreased by over 20 million c.ft. Having regard to the difficulties, the net result must be pronounced good. The Corporation had never had to pay anything out of the rates on their gas undertakings; and he did not believe they ever would. When the undertakings were consolidated, the area would be well served.

Commenting upon the matter last Thursday, the "Staffordshire Sentinel" said: "We understand that the Gas Company's depot at Etruria formally passes into the hands of the Corporation to-morrow, and will become the headquarters of the Corporation's four existing works—Burslem, Fenton, Longton, and Stoke—which, when the reconstruction is completed, will receive gas in bulk from the Etruria works for distribution. It is a splendid scheme in every way; and we hope to hear of the Council dealing adequately with the question of Mr. Mackay's salary. The services he has rendered and is to render to the Corporation are of the highest professional value, and of enormous and lasting benefit to the Potteries and district."

LUTON GAS COMPANY AND THE TOWN COUNCIL.

At a recent Meeting of the Luton Town Council, the following letter was read from the General Manager of the Gas Company :

"I understand from what I have seen in the local papers and from the Borough Surveyor's visit here that you do not wish to appoint an inspector to check the calorific value of our gas and the test which we have to make on same, but that your Council wish the Borough Surveyor to come down and examine our instruments and generally see that we are supplying gas of 490 B.Th.U.—the value we declared, and which we are now and in future going to supply. As a matter of fact we are endeavouring to supply gas regularly of 500 B.Th.U.

"I believe, before coming to inspect the value of our gas, you are supposed to give us certain notice. I forget what the period is ; but I wish to say we shall be quite pleased for your official or the Surveyor to come in and inspect our record books, giving the calorific value of the gas, at any time you or he wish to, without giving us any notice. In addition, I would suggest it may be of convenience to your Council and the Surveyor if we sent him the records of our gas tests—say, at the end of each month or at any period he would suggest.

"The Gas Regulation Act specifies a recording calorimeter to be approved by the Referees. The Referees have temporarily approved of our calorimeter ; but up to the present they have not settled on any official recording calorimeter for any company or gas undertaking. We should. therefore, give the records of the recording calorimeter, and the check tests we make every day to see that the recorder is working properly."

The Borough Engineer had reported to the Highways Committee as to the working of the Gas Company's calorimeter, and as to the check tests made ; and the Highways Committee considered it unnecessary to purchase a separate recording instrument, and had decided to accept with thanks the Company's offer to supply records of their gas tests month by month.

In submitting this report, Alderman A. B. Attwood said the matter had been carefully considered in all its aspects, and the Committee thought it would be a waste of money under the circumstances to appoint another official. There had always been very friendly relations between the Council and the Gas Company, with the one exception of the recent contest over the question of price under the revised method of charging. He thought the Company now felt they could go on again in the old friendly way, and he himself hoped that this friendly feeling would be maintained for a long time.

Mr. C. H Osborne said it had to be remembered that it was not a matter of debating the respectability or the reliability of the Gas Company, but of checking the value of the gas supplied by them. Perhaps the Committee had taken a wise course ; but it was not always good practice for a supplier of goods to test his own articles. There should be an opportunity in the near future for the Council to make some independent tests. It was not a case of appointing another official, but only a matter of £50 for purchasing a calorimeter to enable the Borough Engineer to make an independent test.

The report of the Committee was adopted.

LYTHAM AND ST. ANNES GAS SUPPLY.

A Scheme for One Undertaking.

An important scheme is now under consideration by the new Borough of Lytham St. Annes. For some time the two Councils have had in mind one combined gas undertaking for the new borough ; and they have had the assistance of Mr. W. Doig Gibb, Mr. J. H. Ranft (the Lytham Gas Engineer), and Mr. A. B. Dawson (the St. Anne's Accountant) as advisers. The St. Annes Council decided a little time ago to purchase the undertaking of the St. Annes Gas Company for £69,000 ; and the agreement awaits the sanction of Parliament.

The first proposal was to improve the equipment of the two undertakings ; but a new suggestion has been made, and is said to have many good points to recommend it—practically the scrapping of the two existing gas plants, except the holders, and the construction out at Eastham, Saltcoates, of an entirely new works, at a cost of something like £81,000. These new works would serve the new Borough for five years—until 1928—when a further £15,000 would be required for extensions. By building the new works, with their cheaper cost of production, it is estimated that a saving to the consumers would be effected of about £66 000 in five years.

Many meetings of the two authorities have been held, and the larger scheme for a new works has been favourably commented upon by the councillors.

Gas and Electricity under One Control.—The Gas and Electricity Departments of the Bingley (Yorkshire) District Council are under the control of one Committee. The Council have their own gas-works ; but the electricity is supplied in bulk by the Keighley Corporation, and has suffered many breakdowns. Balance-sheets for the two departments were presented to the Council last week for the year ended March 31. In the Gas Department there is a deficiency of £7584 to add to a deficiency brought forward from the previous year of £2094, making a total of £9879 at the commencement of the current year. It is attributed largely to extraordinary expenditure incurred during the coal stoppage ; but the Chairman (Mr. T. Snowden) said that affair was not entirely responsible. The Council had taken a false pride in being among the cheapest gas suppliers in the country, and had failed to keep the plant in an up-to-date and satisfactory condition. He was convinced from investigations which had been made into the works plant and distributing equipment that there must be some alteration both in production and in organization. They would have to be stringent in the methods of working. He attached no blame to the present Manager. The Electricity Department showed a deficit of £303, as compared with £2531 last year ; and it was the best balance-sheet this department had ever shown.

BLACKBURN CORPORATION GAS UNDERTAKING.

Annual Report.

Mr. G. P. Mitchell, Gas Engineer and Manager to the Corporation of Blackburn, referring to the financial results of the last municipal year, in his annual report, states that on the twelve months there is a gross profit of £31,178, as compared with £39,748 the previous year. Against this, however, sinking fund and interest charges have increased by £3297 to £44,759, leaving a net deficiency of £13,581. In the total expenditure there is a decrease from £246,115 to £215,025 ; but the income from residuals has fallen from £90,532 to £43,251. It is further pointed out that it has been necessary to appropriate from revenue capital and renewal charges amounting to £14,284.

During the year 50,603 tons of coal were carbonized, against 58,810 tons in 1921. This was accounted for, first, by the saving effected by the vertical retorts, and, secondly, by the abnormal amount of coke used during the coal dispute in the manufacture of carburetted water gas. The make of gas per ton was the highest recorded ; being 15,487 c.ft., against 12,883 c.ft. last year. The gas sold per ton was 14,668 c.ft., against 12,122 c.ft.

The serious slump in the market for residuals, with the loss of revenue from coke and other bye-products, during the coal dispute was responsible for the unfavourable results. Finally, Mr. Mitchell estimates the loss to the department by the coal strike as £38,500.

HINCKLEY GAS-WORKS.

A Satisfactory Year.

Another highly satisfactory year at the Hinckley Gas-Works has been revealed by the annual report presented by the Manager (Mr. Fred Lee), which stated that the gross profit (after paying income-tax) was £6030, out of which £769 had been paid for interest on loans, and £1743 on sinking fund account, leaving a net profit of £3517. Out of this balance, it has been decided to meet the expenditure on special renewals account amounting to £1468, and £163 loss on War Loan stock. The receipts for gas sold were £4324 more than last year, due to the increased consumption and no rebate (under the Coal Prices Order) being allowed as in the previous year. Receipts for all residuals were considerably lower, and would be still lower during the current year. The returns for coke, tar, and sulphate of ammonia were £4296 less. The amount received for spent oxide was sufficient to pay for the cost of purification, and £78 over. This year the expenditure was in excess of receipts by £80. The gas sold was 141,693,200 c.ft. This was 11,925,000 c.ft., or 8·40 p.ct., more than last year. The gas unaccounted-for was 2·28 p.ct., compared with 2·01 p.ct. last year. The carburetted water-gas plant was started in June last, and assisted in maintaining the supply of gas during the last weeks of the coal dispute.

In moving the adoption of the report, Mr. Bott said the figures showed a successful year's working—in fact, one of a long series of successful years—and the gas consumers of the town might congratulate themselves on having a very valuable asset in the gas-works. The year had been nearly a record as regarded profits. The result was the more extraordinary because many works, largely due to the coal dispute of last year, had had serious losses. As mentioned in the Manager's report, the dispute cost Hinckley consumers nothing extra for gas or coke ; and they received a good supply during the whole of the time the mines were stopped. The present plant was designed in 1898 to produce 100 million c.ft. ; and in the past year 147 million c.ft. had been produced. The water-gas plant had helped considerably to cope with the large increase in demand. It was worthy of note that the consumption of gas had increased from 99 million c.ft. in 1914 to nearly 142 millions this year. At present prices there could be no doubt gas was the cheapest fuel for power, light, or heat. He had previously said the works were equal to the whole indebtedness of the town. They owed £77,000, and the undertaking was worth considerably more than this. They were indebted for the splendid results to the careful way in which the works had been managed by Mr. Lee.

Mr. Hurst also referred to the excellence of the report, which was accepted with much satisfaction—a vote of thanks being passed to the Manager for his efforts.

Record Output at Oswaldtwistle.

In the Oswaldtwistle District Council, on June 29, Mr. T. C. Usher (the Chairman of the Gas Committee) said the output of gas for the past year constituted a record. Altogether, 101,000,000 c.ft. were supplied from the works—an increase of 6,085,000 c.ft. over the previous year. The financial results were very satisfactory. Despite the coal strike and the slump in residual products, the gross profits amounted to £8463 ; the net profit being £6224. This represented a net profit of 1s. 3¾d. per 1000 c.ft. of gas sold. The price having been reduced by 6d. (to 3s. 9d.) last December, the result was distinctly creditable. The results were exceptional—especially considering that some undertakings recorded substantial losses with much higher charges for gas supplied. The price had been further reduced by 8d. per 1000 c.ft., making a total reduction of 1s. 2d. within six months ; the net prices to ordinary consumers now being 3s. 1d. net, and to power consumers from 1s. 11d. to 2s. 6d. per 1000 c.ft. Mr. Usher congratulated the Gas Engineer upon the excellent results achieved under his management. Mr. J. H. Davies (the Gas Engineer) said every man in the department, from the highest to the lowest, had endeavoured to give good service, and had contributed to the results achieved. The net outstanding debt was £6800, against which they had in the reserve fund over £7000 ; so that virtually it could be said the works were free from debt. This year was the outcome of the policy inaugurated fifteen years ago, and courageously carried on by the Committee since then, in face of great difficulties,

TRADE NOTES.

Tully Gas Plants for Japan.

Tully Gas Plants, Ltd., of Millgate, Newark-on-Trent, have received a further order from Japan for two of their medium-sized Tully gasification plants.

A Pamphlet of Calorimeters.

Messrs. A. Gallenkamp and Co., Ltd., of Nos. 19 and 21, Sun Street, Finsbury Square, E.C., have issued a pamphlet of calorimeters for solid, liquid, and gaseous fuels, in which prices and illustrated descriptions are given of a number of instruments—including Darling's, Lewis Thompson's, Boys', Simmance's, and Parr's.

Steel Tanks.

A new catalogue dealing with "Eclipse" steel tanks is being issued by Messrs. Fredk. Braby and Co., Ltd., of Petershill Road, Glasgow, in which are illustrated some of the many purposes for which they have designed and produced tanks and other vessels. Apart from ordinary plain tank work, all other phases of steel-plate work are undertaken by the firm. Their tank shops are, it is stated, among the largest and best equipped in the country; and they have their own rolling mills alongside, where the material for "Eclipse" tanks is specially produced. Other catalogues which we have received from Messrs. Braby and Co. relate to steel unit buildings, steel storage bins and furniture, and steel puttyless rooflights.

Transmission Accessories.

A new transmission catalogue has been published by the Skefko Ball Bearing Company, Ltd., of Luton, which, in view of the general interest that is at the present time being taken in all methods of economy—and particularly in connection with power consumption—it is felt will make a special appeal. There are sketches and photographs of the various transmission accessories which go to make up the "Skf" efficiency equipment. It is pointed out that one of the most frequent forms of factory leakage is the loss of power occasioned in driving transmission shafting which is mounted on defective or unsuitable bearings. "Skf" ball bearings applied to line shafting embrace what are claimed to be three unique features: Self-alignment, maximum number of balls, and ability to withstand axial thrust. The manner in which these advantages are secured is fully set out; and it is said that many insurance companies give preferential terms to factories equipped with ball bearings.

A Century of Progress.

In a profusely illustrated brochure entitled "A Century of Progress," the Horseley Bridge and Engineering Company, Ltd., of Tipton, set forth concisely the record of the firm, which, it is remarked, had the singular good fortune of being "in at the birth" of a number of the big practical developments that have made so much difference in the life of the world. The exact date of the starting of the business is uncertain, but was somewhere about the year 1770. The real history of the Company, however, may be said to have begun in 1813, from which date the output of iron and coal in their raw state steadily improved; and in 1817 castings of no mean order were made. Mr. Manby, who was then in control, constructed in 1822 to his own patent the first iron vessel propelled by steam—the famous "Aaron Manby," which was wholly built at the Company's Tipton works, shipped in pieces to London, and assembled in the Surrey Canal Dock at Rotherhithe. She was then taken across the Channel and up the Seine to Paris by Captain (afterwards Admiral Sir) Charles Napier, with Mr. Manby's son Charles (afterwards Secretary to the Institution of Civil Engineers) as Engineer. Other vessels were built by the firm, until a natural demand arose for ships of an increased tonnage—a demand which, owing to their situation away from the seaboard, the Horseley Company could not meet. At an early date bridges and locomotives were also constructed by the firm, who subsequently engaged in engineering work of all kinds. Certain it is, the booklet says, that some of the first and largest gasholders in the country were constructed and erected by the Company, whose products in this respect are landmarks all over the world. In 1885 Mr. Daly, the present Managing Director, took up his position, which he has held continuously since his appointment; and in addition he is now Chairman of the Company, the name of which was altered from the Horseley Iron and Coal Company to its present form in 1916.

Proposed Gas-Works Purchase.—In the matter of the proposed purchase of the Dysynni Gas-Works, Towyn, the Towyn and Aberdovey Council have decided as a preliminary to engage the services of an expert for the purpose of valuation of the works and property.

Harrogate Gas Price Reduction.—The announcement is made by the Directors of the Harrogate Gas Company that from the reading of the meters for the quarter ended March 31 last the gross price of gas is reduced to 10d. per therm. This price corresponds with 3s. 10d. per 1000 c.ft. on the old basis of charge, and is equivalent to a reduction of 7½d. per 1000 c.ft. on the charge for the preceding quarter, or 4d. per 1000 c.ft. less than was charged for gas prior to the miners' strike of 1921. A corresponding reduction will be made by rebate in respect of gas consumed through slot-meters.

Public Lighting of Deal.—The Deal Town Council have had before them a recommendation of the Lighting Committee to enter into a contract with the Deal and Walmer Gas Company to light the lamps for a period of three years. The effect of the arrangement will be that the town will have fifty extra lights over and above the number last season; that all lighting will commence eight days earlier and will finish one month later than last season; that none of the lights will be extinguished, as has been the custom recently, during the full-moon period. The recommendation was agreed to, subject to a clause being inserted in the contract to allow of an adjustment of price in accordance with alterations in the cost of coal and labour.

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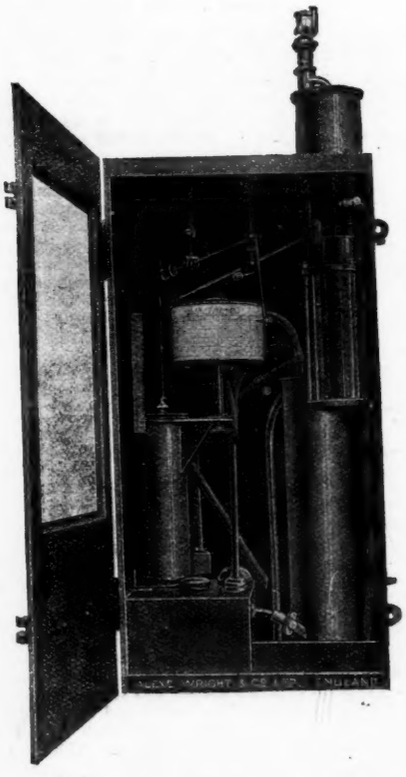

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CURRENT SALES OF GAS PRODUCTS.

Tar Products in the Provinces.

July 3.

The average values for gas-works products during last week were: Gas-works coal tar, 40s. 6d. to 45s. 6d. Pitch, East Coast, 72s. to 74s. f.o.b. West Coast—Manchester, 68s. to 70s.; Liverpool, 69s. to 71s.; Clyde, 71s. to 72s. Benzole 90 p.ct. North, 2s. to 2s. 1d.; crude 65 p.ct. at 120° C., 1s. 2½d. to 1s. 4½d. naked at makers' works; 50-90 p.ct., naked, North, 2s. to 2s. 1d. Toluole, naked, North, 2s. to 2s. 3d. nominal. Coal tar crude naphtha in bulk, North, 8½d. to 9½d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 10d. Heavy naphtha, North, 2s. to 2s. 1d. Creosote, in bulk, North, liquid, 5d. to 5¼d.; salty, 4¾d. to 5d. Scotland, 4⅞d. to 4¾d. Heavy oils, in bulk, North, 6¼d. to 6½d. Carbolic acid, 60 p.ct., 2s. to 2s. 1d. Naphthalene, £12 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 5d. per minimum 40 p.ct. nominal—no business doing; "B" unsaleable.

Manchester District Tar Prices.

The average price realized for the sale of tar in the Manchester district, according to the sliding-scale, for the month of June, was £2 7s. 5·33d. per ton.

FROM A MARKET CORRESPONDENT.

Some improvement is to be noted in these materials since I last wrote, and generally there is a better feeling all round, although it remains to be seen whether prices will be carried to a higher level. There has been no change of importance in the market for pitch. Makers still have very optimistic ideas; but there is no indication of the views of Continental buyers. The South Wales demand is steady, and the requirements for road repairing and road-making purposes continue strong. The latest values are between 65s. and 75s. per ton, and from South Wales we hear of 80s. having been paid; but there is no confirmation of the price of 87s. 6d. reported last week. Solvent naphtha is in good demand, and those who have been selling forward are now much more anxious. The latest value is 2s. 2d. per gallon. Carbolic acid remains steady without much business this week; but cresylic acid shows a slight improvement at about 2s. 4d. per gallon. The demand for naphthalene is poor, both for crude and refined; but the prices are practically without change. Creosote continues very firm, with prospects of an advance upon present value of 6½d. per gallon. In intermediate products there is nothing fresh to report beyond a very slight increase in the demand from the Continent.

Sulphate of Ammonia.

Sulphate of ammonia continues steady, with rather more export business than a week ago. Prices for home deliveries, July and August, are now £16 3s. per ton for neutral quality, 25⅜ p.ct. ammonia, and £15 for ordinary quality, 25¼ p.ct. ammonia. These figures compare favourably with those of nitrate of soda so far as the nitrogen value of the material is concerned.

APPLICATIONS FOR PATENTS.

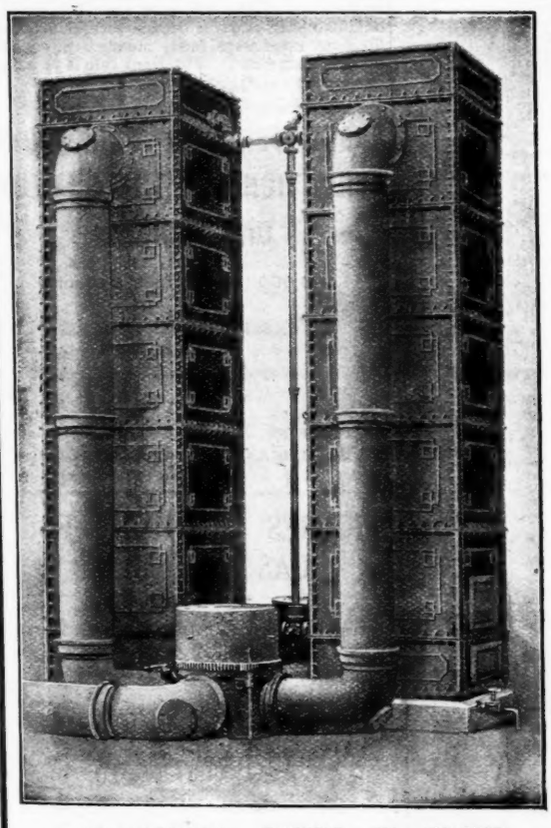
[Extracted from the "Official Journal" for June 28.]

Nos. 16,828 to 17,484.

DAVIES, H.—"Gas cooking ovens." No. 17,259.
GAS RESEARCH COMPANY.—"Gas-producer systems." No. 17,372.
HADWEN, H. E.—"Anti-vibration devices for flexible gas-tubes." No. 16,833.
HARTLEY, H., and HARVEY, F.—"Gas cooking ovens." No. 17,259.
HASSALL, W.—"Gas-fires, &c." No. 16,895.
LANDIS AND GYR AKT.-GES.—"Chart recording-device for meters." No. 17,051.
LENNARD, F.—"Incorporating rubber with tar." No. 17,046.
LYNCH, H.—"Heating gas-ovens." No. 17,298.
MITCHELL, E. A.—"Means for controlling flow and pressure of fluid in fluid-distributing systems." No. 17,156.
MITCHELL, E. A.—"Connecting together branch and main pipes in fluid-distributing systems." No. 17,157.
PARKINSON AND W. & B. COWAN, LTD.—"Automatic compensation of pendulum-controlled mechanism." No. 16,961.
RADIATION, LTD.—See Hartley, H., and Harvey, F. No. 17,259.
WILLIS, H.—See Hadwen, H. E. No. 16,833.
WILSON, W. A.—See Hartley, H., and Harvey, F. No. 17,259.
YATES, H. J.—See Hartley, H., and Harvey, F. No. 17,259.

An explosion in the meter-house at the Coatbridge Gas-Works gave rise to fire, and a new rotary meter was destroyed, with other equipment. The estimated damage is £2500.

The Birmingham Gas Committee on Monday of last week presented illuminated addresses, expressing appreciation of their services, to Mr. J. J. Edwards, Mr. O. F. Duck, and Mr. T. Gregory on their retirement from the Corporation service. Mr. Edwards (aged 62) had been in the service of the Department 41 years, and was Chief Clerk at the Saltley works; Mr. Duck (61) was Storekeeper at the Windsor Street works for 30 years; and Mr. T. Gregory (71) had probably a longer service than anyone else in the Birmingham Gas Department. He had completed 53 years' service with the undertaking and for the last 17 years had been a foreman at Windsor Street. Previously, for many years he was in the mainlaying department; while in 1868, when he started, he was in the fittings department.



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STOCK MARKET REPORT.

THE Stock Exchange reopened last week a little shaky; but things soon took a better turn. Markets became firmer and more active, and this aspect progressed until the close was quite bright. The gilt-edged division was strong, especially Home Government securities. The big four on Friday marked: Consols 57-57½, War Loan 100⅝-100 7/16, Funding 87⅜-87⅝, Victory 89-89½. Bonds shared in the advance, and Indians were strongly supported. Home Rails were dull; but Canadian and Argentine throve.

The Foreign Market opened weak, but rallied. Miscellaneous were mixed.

Business in the Gas Market showed increased activity; and it was well distributed throughout the list. The tone was very firm, and several advances were scored. The London Companies were unchanged. In the Suburban and Provincial group, Hastings and St. Leonards 3½ p.ct. rose 7, Maidstone 5 p.ct. 7, Plymouth and Stonehouse 1, the three Sheffields 3½ each, South Shields 3, and Wandsworth debenture 1½. Abroad, Malta and Mediterranean rose ½, Oriental 2, South African ½, and Cape Town debenture ½. Imperial Continental was inclined to be easier, and the debenture fell 1.

The following transactions in gas during the week were recorded: On Monday, Alliance and Dublin 62½, Commercial 4 p.ct. 93¼, 94½, European 12⅛, 12⅞, Gas Light ordinary 96½, 96⅝, 96¾, 96⅞ 97, 97⅛, 97¼, 97⅜, 97⅛, 98, ditto maximum 64⅛, ditto debenture 64, Imperial Continental 162, 162½, 163, 164, South African 7, South Metropolitan 96, 96½, 96⅜, 97½, ditto debenture 61⅜, Wandsworth "B" 97½, Swansea 7 p.ct. preference 102½, 102½, Tottenham 6 p.ct. debenture 98. On Tuesday, Bombay 93s. 1½d., Brentford debenture 75, Commercial 3½ p.ct. 93½, 94, Continental Union 37½, Gas Light ordinary 96½, 96⅜, 97½, ditto maximum 63, 63¾, 64, 64½, ditto preference 77, Imperial Continental 162, 163½, Monte Video 64, Oriental 94⅝, 97⅜, Primitiva debenture 74½, South Metropolitan 96½, 96½, 97, ditto debenture 61⅜, Wandsworth "B" 98½, British 7 p.ct. preference 10 1/16, 10 3/16, ditto (Norwich) 4 p.ct. debenture 77, 77½, Croydon 5 p.ct. maximum "D" 76½, 77, Grays and Tilbury 4 p.ct. debenture 70, 70½, Metropolitan of Melbourne shares 7 13/16, 7⅞, Swansea 7 p.ct. preference 102½. On Wednesday, Bombay 92s. 6d., Bournemouth "B" 9 15/16, 10, ditto debenture 54⅞, 55, Cape Town preference 6¼, ditto debenture 75, Commercial 4 p.ct. 93, 94, 94½, European 12⅝, 12⅞, Gas Light ordinary 96¼, 96½, 97, 97¼, ditto preference 78, 78¼, 78½, 79, ditto debenture 62⅜, 63⅜, Imperial Continental 162½, Lea Bridge 85, Plymouth and Stonehouse 98½, 99, Primitiva 14s., 16s., 16s. 6d., Sheffield "C" 94, South Metropolitan 96½, 97¼, 97½, Tottenham "B" 99, 99⅜. On Thursday, Alliance and Dublin 60 7/16, 60½, Gas Light ordinary 96¼, 96½, 96⅝, 96⅞, ditto maximum 64¼, ditto debenture 64, Imperial Continental 161, 162, 162½, 163½, Lea Bridge 86, Primitiva preference 41s. 9d., South Metropolitan 96½, 96⅝, Hornsey 5 p.ct. preference 90, Tottenham 6 p.ct. debenture 100. On Friday, Brighton and Hove original 170, European 12⅞, Gas Light ordinary 96½, 96⅝, 96¾, 97, ditto preference 78⅜, ditto debenture 63¾, Hastings and St. Leonards 3½ p.ct. 62½, 62½, Imperial Continental 161, 162½, Maidstone 90½, 91, Primitiva preference 40s., 41s. 3d., 42s., South Metropolitan 96⅜, 97, South Suburban 100½, Swansea 6½ p.ct. debenture 105½.

In the Money Market, the demand increased as the turn of the half year approached; but obtainable terms never became formidable, and discount rates were fairly steady. Silver remained unchanged. The Bank rate is 3½ p.ct., as fixed on the 15th ult.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Transactions.
£			p.c.					
182,049	Stk.	Mch. 15	4	4%	Aldershot 4 p.c. Pref.	..	70—75	...
1,551,868	,,	Apl. 12	2½	3 1/16%	Alliance & Dublin Ord.	59—64	60—65	60 7/16—62½
374,000	,,	Jan. 12	4	4%	Do. 4 p.c. Deb.	76—79	62—67	...
280,000	5	May 18	7½	4/-	Bombay, Ltd.	5⅞—6⅛	4¼—5	92/6—93/1¼
100,000	5	Feb. 23	16	7½%	Bournemouth Gas and Water { 5 p.c. / B 7 p.c. / Pref. 6 p.c. / 4 p.c. Deb.	..	10½—11¼	...
383,110	10	,,	7	7%		15—15½	9—10	9 15/16—10
115,000	10	,,	6	6%		13⅛—14	8—9	...
162,065	—	June 29	—	4%		..	63—68*	...
992,045	Stk.	Feb. 9	14	56/-	Brentford A Consolid.	261—266	90—95	...
734,920	,,	,,	11	55/-	Do. B New	204—209	9 ›—95	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	80—85	...
221,400	,,	June 15	4	4%	Do. 4 p.c. Deb.	91—93	73—78	75
214,775	,,	Mch. 15	11	11½%	Brighton & Hove Orig. A Ord. Stk.	208—213	165—170	170
244,200	,,	,,	8	8½%		154—159	118—123	...
1,287,500	Stk.	July 28	5	5%	Bristol 5 p.c. max.	..	..	...
530,000	20	Mch. 15	12½	10%	British	..	29—31	...
120,000	Stk.	June 29	4	4%	Do. 4 p.c. Deb. Stk.	44—45	76—80*	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	88—90	53—58*	...
100,000	10	June 1	—	7%	Cape Town & Dis., Ltd.	85—87	6¾—7¼	...
100,000	10	Apl. 27	—	4½%	Do. 4½ p.c. Pref.	1⅛—2⅛	6¼—7⅛	6⅞
100,000	Stk.	June 29	4½	4½%	Chester 5 p.c. Ord.	4—6	6¼—7⅛	6⅞
157,150	,,	Feb. 26	5	5%	Commercial 4 p.c. Stk.	70—75	73—78*	75
1,513,280	,,	Mch. 15	5/9/4	42/8	Do. 3½ p.c. do.	108—110	..	...
560,000	,,	,,	5½	38/4	Do. 3 p.c. Deb. Stk.	106—108	91—96	93—94½
475,000	,,	June 15	3	3%	Continental Union, Ltd.	103—105	92—97	93½—94
800,000	,,	Dec. 15	4	—	Do. 7 p.c. Pref.	69½—71½	55—60	...
200,000	,,	,,	7	—	Croydon A 10 p.c.	76—79	37—42	37½
51,600	,,	Feb. 23	15	15%	Croydon B and C 7 p.c.	115—118	55—60	...
278,400	,,	,,	12	12%	Derby Con. Stk.	..	200—210	...
492,270	Stk.	—	6	4½%	Do. Deb. Stk.	..	160—170	...
55,000	,,	,,	4	4%	European, Ltd.	123—125	80	...
1,002,180	10	Jan. 26	10	5/0	Gas Light and Coke { 4 p.c. Ord / 3½ p.c. max. / 4 p.c. Con. Pref. / 3 p.c. Con. Deb. / 10 p.c. Bonds	102—104	65	...
16,298,975	Stk.	Feb. 23	4/17/4	46/8		17⅛—18	..	...
2,600,000	,,	,,	3½	35/-		98—102	12—13	12½—12⅞
4,062,235	,,	,,	4	4%		76—79	96—99	96½—98
4,674,850	,,	June 15	3	3%		96—99	64—67	63—64½
130,000	,,	Dec. 11	10	10%		72¼—74½	77—81	77—79
82,500	,,	Sept. 14	5	3½%		..	61—64	62½—64
258,740	,,	Mch. 15	3½	2½%	Hastings & St. L. 5 p.c.	..	..	...
70,000	10	May 18	11	5%	Do. 3½ p.c.	87—89	60—63	62½—62½
86,600	Stk.	Mch. 15	9	9½%	Hongkong & China, Ltd.	16½—16¾	6—7	...
131,000	,,	,,	7½	7½%	Hornsey 7 p.c.	..	115—120	...
65,780	,,	,,	6½	5½%	Ilford A and C	151—154	120—130	...
65,500	,,	June 29	4	4%	Do. B.	115—118	100—110	...
1,976,000	,,	May 18	9	5%	Do. 4 p.c. Deb.	92—94	73—78*	...
404,800	,,	Feb. 9	3½	3½%	Imperial Continental	150—160	162—167	161—164
235,242	,,	Mch. 15	6½	6½%	Do. 3½ p.c. Deb. Red.	84—86	74—79	...
2,498,905	,,	Feb. 26	10	37/6	Lea Bridge Ord. 5 p.c.	119—121	83—88	85—86
306,083	,,	June 26	4	4%	Liverpool 5 p.c. Ord. { A. / B.	211—213	..	...
165,736	,,	Feb. 23	7/5/6	6%		146—148	..	...
63,480	,,	June 29	—	3%	Do. 4 p.c. Pr. Deb. Stk.	..	..	...
75,000	5	,,	6	6%	Maidstone 5 p.c.	..	87—92	90½—91
250,000	100	Apl. 3	4½	4½%	Do. 3 p.c. Deb	..	47—50*	...
541,920	Stk.	June 1	4	4%	Malta & Mediterranean Met. of { 4½ p.c. Deb.	4½—4⅝	3½—3¾*	...
1,875,892	,,	Feb. 23	4½	4½%		99—101	91—98	...
529,705	,,	June 29	3½	3½%	Melbourne	11½—12	63—68	64
15,000	10	Aug. 26	—	7/6	Monte Video, Ltd.	98½—99½	83¾—84½	...
55,940	10	Mch. 15	7/14/0	10/1⅝	Newcastle & Gatsh'dCon.	82—83	68—70*	...
300,000	Stk.	May 18	8	8%	Do. 3½ p.c. Deb.	..	12⅜—13	...
60,000	5	,,	10	—	North Middlesex 10 p.c.	14—15	10¼—11¼	...
188,120	Stk.	June 29	—	6/3/9%	7 p.c.	117—122	92—97	94½—95⅝
60,000	50	Mch. 15	13	6½/6	,, ,, Ltd.	7½—7¾	2—3	...
100,000	50	,,	12	57/6	Oriental, Ltd.	..	93—98*	...
249,980	5	—	8	—	Ottoman, Ltd.	128—131	87—90	...
499,960	5	—	5	—	Plym'th & Stonh'se 5 p.c.	118—121	78—83	...
521,600	100	June 1	4	4%	Portsea Island, B	5½—6	⅞—1	14/—16/6
600,000	Stk.	Jan. 26	4	4%	C	4¼—5	2—2½	40/—42/-
346,198	,,	June 29	4	4%	Primitiva Ord.	91—93	74—76	74½
150,000	10	Mch. 30	6	6/-	Do. 5 p.c. Pref.	..	55—60	...
125,000	50	Jan. 3	5	5%	Do. 4 p.c. Deb.	85—87	53—58*	...
135,000	Stk.	Mch. 15	10	5%	Do. ,, ,, 1911	10⅛—11	5½—6½	...
209,984	,,	,,	10	5%	River Plate 4 p.c. Deb.	47—49	36—39	...
523,500	,,	,,	10	5%	San Paulo { 6 p.c. Pref. / 5 p.c. Deb.	223—224	93—95	...
133,201	Stk.	Sept. 15	4	4%	Sheffield A	222—224	93—95	...
90,000	10	June 29	9	7½%	Do. B	220—222	93—95	94
6,609,895	Stk.	Feb. 9	5/4/0	5%	Do. C	..	..	...
250,000	,,	Jan. 12	—	5%	Shrewsbury 5 p.c.	..	7—9*	7
1,895,445	,,	,,	3	3%	South African	10½—11½	96—99	96—97½
224,820	,,	Feb. 23	8½	8½%	South Met. Ord.	111—113	96—98	...
1,087,795	,,	,,	6	5½%	Do. Red. Pref.	..	60—63	61½
368,837	,,	June 15	5	5%	Do. 3 p.c. Deb.	72½—74½	107—111	...
647,740	,,	May 18	5	5%	South Shields Con. Stk.	157—159	98—103	100½
121,275	,,	June 29	4	4%	S'th Suburb'n Ord. 5 p.c.	114—116	93—98	...
120,000	,,	Feb. 23	6	5½%	Do. 5 p.c. Deb. Stk.	116—118	70—75	...
782,275	,,	,,	—	7½%	Southampton Ord.	99—102	63—68*	...
181,255	,,	June 15	4	4%	Do. 4 p.c. Deb. Stk.	..	112—117	...
182,380	10	Dec. 30	5	—	Tottenham { A 5 p.c. / B 3½ p.c. / 4 p.c. Deb.	135—138	98—103	99—99½
149,900	10	July 1	5	5%	District	115—117	75—80	...
236,476	Stk.	Mch. 15	5	3½%		87—89	1—2	...
30,000	,,	Mch. 15	8½	66/3	Tuscan, Ltd.	5—6	45—50	...
255,636	,,	,,	6½	51/3	Do. 5 p.c. Deb. Red.	93—95	71—73	...
108,075	,,	,,	—	46/4½	Tynemouth 5 p.c. max.	108½—109		
140,865	,,	,,	6½	46/4½	Wandsworth, Wimbledon, and Epsom—			
352,000	,,	,,	6½	45/-	Wandsworth A 5 p.c.	151—156	110—115	...
98,000	,,	,,	6½	50/-	Do. B 3½ p.c.	129—134	95—100	97½—98½
88,416	,,	June 29	5	3%	Do. C.	..	85—90	...
					New Ordinary	..	85—90	...
					Wimbledon 5 p.c.	117—122	92—97	...
					Epsom 5 p.c.	121—126	95—100	...
					3 p.c Deb. Stk.	66—69	57—60*	...

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WALTER KING, LTD., "JOURNAL" Offices, 11, Bolt Court, Fleet Street, London, E.C. 4.

Congleton Gas-Works Difficulty.—The Clerk to the Congleton Town Council reported to a meeting of the Gas Committee last week that he had been in communication with Messrs. H. L. & W. P. Reade (Solicitors on behalf of Sir Walter Shakerley), in reference to the site for the new holder at the gas-works, and stated that the firm informed him that at present they could not advise their client to permit the erection of the holder on the site referred to. The Chairman (Alderman Jolly) said time was going on and they could not get any more forward with this question. Mr. Lomax, who had been called in to give expert opinion on the different sites, had stated that the one chosen near the park was eminently suitable, but that another on the Bye Flat was out of the question. It would cost them £6000 more to erect the holder there; and the Ministry of Health would not permit them to go to such extravagance as this. The best way out of the difficulty was to apply to the Ministry of Health for permission to borrow the money for the gas-works' extension—estimated at £35,000—and also to be allowed to erect the new holder on the chosen site. The Mayor thought the inquiry suggested was the only plan to adopt; and he therefore seconded the Chairman's proposition, which was carried.

The Ministry of Health have extended until May 31, 1923, the time allowed by the Chesterfield Gas and Water Board Act for the exercise by the Council of powers granted them for the acquisition of certain lands and works.

Councillor Critchley, at a meeting of the Blackburn Education Committee, referring to the substitution of electricity for gas for cooking purposes in schools, inquired if there was some advantage in making the change. The Director of Education said it was an experiment, and the result would be reported later.

The issue of £5000 of 7 p.ct. redeemable preference stock offered to tender for the Crowborough District Gas Company by Messrs. A. & W. Richards was nearly three times subscribed; the tenders ranging from £104 down to the minimum of par. The lowest price accepted was £101 per £100; and the average obtained for the issue was £101 15s., yielding to the investor £6 14s. 2d. p.ct.

At the Conservative Club Assembly Room, Exeter, last Thursday evening, the Willey Cadet Company A.F.C. celebrated at dinner their success in winning the "Football Express" Cup, and in reaching the semi-final of the Devon Junior Cup. The proceedings went with a rare swing from start to finish, and good fellowship reigned supreme. Capt. T. Glanfield (the President) was in the chair, being supported by Mr. F. T. Depree, J.P. (the Chairman of Messrs. Willey & Co., Ltd.), Mr. Thornton Willey, Mr. W. Jackson, Mr. F. B. Roberts, Mr. Fred P. Cottey (Vice-Chairman, Devon County F.A.), Mr. R. Blakemore (Vice-Chairman, East Devon Area), and others prominent in the world of "Soccer." After dinner, there were some appropriate speeches, in the course of which Mr. Depree said he looked upon it as a most auspicious occasion. He believed that the better a man played the better he would work. He thought it a most satisfactory movement in connection with large workshops the corps of the kind should be formed. It gave the lads something to look forward to after the day's work. And it was all the better if the Directors and those who were associated with the men in the general work got an opportunity of mixing with the men, and seeing as much as possible of them. Mr. F. P. Cottey complimented the leaders of the firm on the support they gave the workers in outside activities. He spoke of Mr. Depree's valuable services to the city, and touched upon the sporting spirit shown by the Cadets in their matches.

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GAS-METERS, ORDINARIES, SLOTS, AND REPAIRS,
Foleshill Road, COVENTRY.
Telephone: 596. Telegrams: "GASMETER,"
and at 268, Stockport Road, MANCHESTER.
Telephone: RUSHOLME 976. Telegrams: "GASMETER,"
and 46 & 47, Auckland Street, LONDON, S.E. 11.
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JOHN RILEY & SONS, Limited, Chemical Manufacturers, Hapton, near Burnley, are MAKERS of Special SULPHURIC ACID ("Eagle" Brand), for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 60 years. Reference given to Gas Companies.

APPOINTMENTS, &c., VACANT.

WHEN Filling Vacancies, please REMEMBER THE CLAIM OF THE EX-SERVICE MAN, who, other Qualifications being equal, has the FIRST CALL ON YOUR CONSIDERATION.

BOROUGH OF NEWBURY.
(GAS UNDERTAKING.)
APPOINTMENT OF SALES MANAGER.

APPLICATIONS are invited from persons with Experience in the Sale and Use of Gas Fittings, for the Appointment of SALES MANAGER to the Newbury Corporation Gas Undertaking.
Applicants should state the Salary required, which will not exceed £250 per Annum.
Applications should be sent to the undersigned not later than the 15th of July next, and should be accompanied by *copies* of not more than Three recent Testimonials.
S. WIDDICOMBE,
Town Clerk.
Newbury,
Dated June 27, 1922.

NARBOROUGH AND WHETSTONE GAS COMPANY, LTD.

WANTED — A Practical Working MANAGER. Annual make, about 45 Millions. Full knowledge of Sulphate Making essential.
State Age, Experience, when at liberty, three *copies* of recent Testimonials, and Salary. (Cottage on Works, with Coal and Gas free).
Applications by the 20th July, 1922, to J. C. A. RICHARDS, BLABY HALL, near LEICESTER.

FOREMAN wanted for Mechanical Department at the Croydon Gas-Works, must have up-to-date Experience of General Shop Work, and Repair and Maintenance of Machinery, knowledge of Electrical and Compressed Air Stoking Machinery and other Gas-Works Plant. Good Organizer and Controller of Men. Good Salary for the right man. Free House, Coal, and Gas.
Apply, stating Age, Experience, and all particulars to the undersigned.
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Gas-Works,
Waddon,
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WANTED – Foreman Mechanic (age 30 to 45) for large Gas-Works. Must have Experience in Maintenance and Repairs of all Gas-Works Plant, including Hydraulic and Electrical Machinery. Must also be a good Organizer and accustomed to Job Costing.
Apply, No. 7175, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

APPOINTMENTS, &c., WANTED.

CONSULTING Gas Engineer with Wide Experience, making monthly visits to the Midlands and North of England and South of Scotland, has Time to devote, in an ADVISORY CAPACITY, to any Gas Undertaking.
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FITTER-DRIVER seeks Situation. Life Experience on Power Plant Work, Steam and Internal Combustion Engines, A.C. and D.C. Electric Pumps, &c. Locality or distance no object.
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FIRTH BLAKELEY, SONS, & CO., Ltd., Church Fenton, Leeds, have the following Plant to offer:
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GASHOLDERS—300,000, 172,000, 50,000, 40,000, and Two 5000 capacity.
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CONDENSERS. Sets of 4 Annular, 8 in. & 12 in. Connections. Sets of 6 in. & 9 in. Vertical Pipes. Water Tube Condenser 15 in. Connections.
EXHAUSTERS and ENGINES. Waller's & Donkin's from 50,000 to 2000 capacity per hour, Steam, Gas, and Belt driven.
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Every Requisite for Gas-Works supplied. We undertake Delivery and Erection Complete, and solicit inquiries.
DISMANTLING SPECIALISTS. Surplus and obsolete Plant purchased. Best prices paid. Removal by expert staff.
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FOR SALE, at a reasonable price, COMPLETE COAL-GAS PLANT to Manufacture 350,000 c.ft. per twenty-four hours, including Four Gasholders of respective capacities of 106,000, 94,000, 50,000, and 46,000 c.ft.; Complete WATER-GAS PLANT to Generate 500,000 c.ft. per twenty-four hours, with Relief Holder, Boilers, &c.
Both plants are in First-Class Working Condition and suitable for re-erection.
For list, apply to Mr. W. J. GRAY, Secretary, ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY, D'OLIER STREET, DUBLIN.

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APPROXIMATELY 200 Tons per Month for Wolverhampton and Black Country area. Size 1½ in. to 2 in. Must be free from Dust.
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FOR SALE, at Rossall School, near Fleetwood, Two GASHOLDERS, 35 feet and 20 feet diameter respectively. Offers Invited.
For further particulars, apply to THE BURSAR, ROSSALL SCHOOL.

CONTRACTS OPEN.

TIPTON URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Gas Committee of the above Department invite TENDERS for an Installation of VERTICAL RETORTS, capacity 750,000 c.ft. per day.
Further particulars may be had from the Engineer at the Gas-Works.
Tenders to be sent in by July 10, 1922, and to be endorsed "Tender for Vertical Retorts" and addressed Chairman of the Gas Committee, Alexandra Road, Tipton.
The Council do not bind themselves to accept the lowest or any Tender.
By order,
WILLIAM PRINCE,
Engineer and Manager.

BOROUGH OF CHORLEY.

THE Gas Committee are prepared to receive TENDERS for the Supply of Medium Sized GAS NUTS as follows:
1.—6000 Tons for period ending Dec. 31, 1922, or alternatively,
2.—10,000 Tons for the period ending March 31, 1923.
Tenders must be submitted on the Official Form, obtainable from Mr. Mark Newsome, Gas Engineer, Chorley.
Tenders must be returned to the undersigned by July 24, 1922, endorsed "Gas Fuel."
The Council do not undertake to accept the lowest or any tender, and reserve the right to allocate the whole or part of the required tonnage.
JNO. MILLS,
Town Clerk.
June 28, 1922.

BUXTON CORPORATION.
(GAS DEPARTMENT.)
TENDERS FOR GAS COAL.

THE Gas Committee invite Tenders for the Supply of 13,000 Tons of SCREENED GAS COAL and NUTS, Delivered at their Gas Siding, Ashwood Dale, Buxton (Midland Railway), over the Twelve Months commencing Aug. 1, 1922.
Forms of Tender may be obtained from the undersigned.
Sealed Tenders, endorsed "Tender for Coal, Gas Committee," to be delivered to H. G. Curtis, Esq., Town Clerk, Town Hall, Buxton, not later than the first post, Thursday, July 13, 1922.
No Tender necessarily accepted.
F. G. SHAW,
Engineer and Manager.
Gas Engineer's Office,
Buxton,
July 1, 1922.

URBAN DISTRICT OF SPENBOROUGH.
COAL FOR GAS-WORKS.

THE Council of the above District invite TENDERS for the Supply of about 14,000 Tons of SCREENED GAS COAL or NUTS for the Cleckheaton and Heckmondwike Gas-Works respectively for delivery during the Six Months commencing Aug. 1, 1922.
Tenders (upon the Council's Form of Tender only, to be obtained at the office of the Engineer, Mr. A. L. Jennings, Gas-Works, Cleckheaton) must be endorsed "Tender for Gas Coal," and reach me by Saturday, the 15th of July, 1922.
The Council do not bind themselves to accept the lowest or any Tender.
JOHN H. LINFIELD,
Clerk of the Council.
Town Hall,
Cleckheaton,
June 29, 1922.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

TENDERS are invited for the Supply of OXIDE OF IRON Purifying Material.
Full Particulars may be obtained on application to Mr. William W. Woodward, Engineer, Gas Offices, Bloom Street, Salford.
L. C. EVANS,
Town Clerk.

BOROUGH OF HEYWOOD.

THE Gas Committee invite Tenders for the Purchase of SURPLUS TAR.
Specifications and Form of Tender may be obtained from Mr. W. Whatmough, Gas Manager.
Sealed Tenders, endorsed "Tar," to be sent to me not later than Wednesday, July 19, 1922.
By order,
GEO. G. BOUCHIER,
Town Clerk.
Municipal Buildings,
Heywood,
July 1, 1922.

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MANCHESTER CORPORATION.
(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for the Construction and Erection of New LATTICE GIRDER STRUTS to GUIDE FRAMING of Nos. 3 and 4 GASHOLDERS at their Gaythorn Station.

Specification and Form of Tender may be obtained on Application to Mr. Godfrey W. Kaye, Secretary, Gas Department, Town Hall, Manchester.

Drawings may be seen, and permission to view the Site and any other information obtained, on Application to the Engineer, at his Office, Rochdale Road Gas-Works, Manchester.

Sealed Tenders, in official envelope, addressed to the Chairman of the Gas Committee and endorsed "Gasholder Guide Framing, Gaythorn Station," to be Delivered at the Gas Offices, Town Hall, Manchester, not later than 9.0 a.m. on Wednesday, the 26th of July, 1922.

The Gas Committee do not bind themselves to accept the lowest or any Tender.

By order,
P. M. HEATH,
Town Clerk.

Town Hall,
Manchester,
July, 1922.

COMPANY NOTICES.

EUROPEAN GAS COMPANY, LIMITED.

NOTICE is Hereby Given that the ANNUAL GENERAL MEETING of the Shareholders will be held on Tuesday, the 11th day of July, at 2 p.m. precisely, at the Offices, Finsbury House, Blomfield Street, London, pursuant to the Regulations of the Company:—

To receive the Report of the Directors and the Accounts of the Company for the year ended the 31st of March, 1922;
To declare a Dividend;
To elect Directors and Auditors in the place of those retiring; and
To transact the Ordinary Business of such Meeting.

The Accounts to be submitted to the Shareholders will be open for Inspection at the Company's Offices on and after the 3rd of July.

The TRANSFER BOOKS WILL BE CLOSED from the 11th July to the 31st July, both days inclusive.

By order of the Board,
F. ELIOT WILLIAMS,
General Manager and Secretary.

In accordance with Clause 48 of the Company's Articles of Association, the Bearer of a Share Warrant may, on Depositing his Warrant at the Office not less than 48 hours before the time of holding any meeting of the Company, with a Statement in writing of his name and address, be present at such meeting, and vote thereat in respect of the share included in such Warrant.

Finsbury House,
Blomfield Street,
London, E.C. 2,
June 30, 1922.

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By

F. SOUTHWELL CRIPPS, Assoc.M.Inst.C.E.

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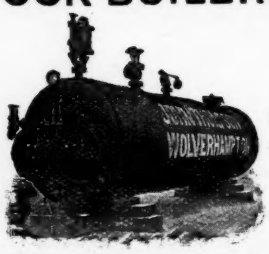

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Three	30	0 × 8	6 × 120	6017/8 & 6026.
One	30	0 × 8	3 × 175	5984.
Two	30	0 × 8	3 × 160	6028/9.
One	30	0 × 8	3 × 120	6025.
Four	30	0 × 8	3 × 100	5678.
One	30	0 × 7	6 × 180	5967.
Three	28	0 × 7	6 × 160	5792/4.

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GAS VALVES WITH PATENT INDICATORS & LUBRICATING FACES.
MOUTHPIECES with DETACHABLE FACES, also AUTOMATIC FASTENINGS
FURNACE & OTHER DOORS, also MOUTHPIECES with ASBESTOS JOINTS.
STRUCTURAL IRON AND STEEL WORK.